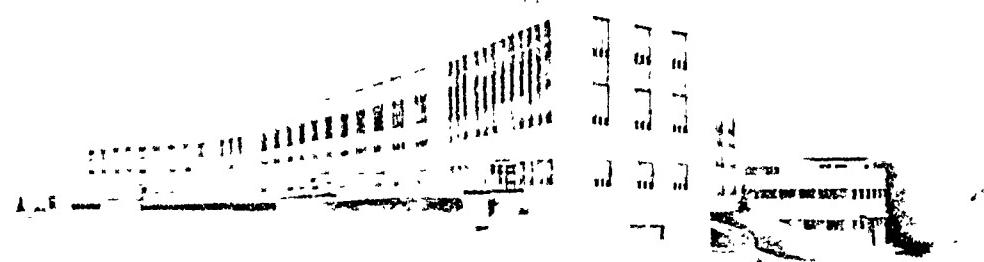


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PROJECT RIM:  
Design and Implementation  
RESEARCH REPORT

MF12.524.003-1005D

Report No. 2

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PROJECT RIM:

Design and Implementation<sup>1</sup>

by

J. Michael Walsh, Ira Donenfeld, Seward Smith, William W. Haythorn,  
Philip L. Briley, Betty Burgoon, William N. Colson, and Mary J. Holiman

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Research Report

MF12.524.003-1005D

Report No. 2

Naval Medical Research Institute  
Bethesda, Maryland

April, 1970

Footnotes

<sup>1</sup>From Bureau of Medicine and Surgery, Navy Department, Research Task MF12.524.003-1005D, and NASA Contract No. L-16,423. The opinions and statements contained herein are the private ones of the writers and are not to be construed as official or as reflecting the views of the Navy Department, the Naval Service at large or the National Aeronautics and Space Administration.

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Original plans for Project RIM were generated by Seward Smith and William W. Haythorn, with short but timely participation by Ladd Wheeler. Much of the planning and execution of details was carried out by others of the permanent staff, especially Ira Donenfeld, J. Michael Walsh and Mary J. Holiman, and also for a time William N. Colson, and, joining the staff later, Philip L. Briley and Betty Burgoon. In addition to the many and varied contributions of these staff members, the assistance of others has also been invaluable to the project. Beverly G. Russell and Iris P. Orent have been responsible for analyses of verbal data. Willidelle Mitchell has assisted wherever needed throughout the project. Secretarial responsibilities, originally covered by Mary J. Holiman, have since been carried out by Carrie M. Funk, Louise T. Martell and Barbara L. Tigert. The room layouts were prepared under the supervision of J. Michael Walsh. Instrumentation was the responsibility of George J. Tresansky, Joseph A. Diachenko, Fred Beuchert, III, Wilfred F. Long, Andrew B. Mathis and Norman R. Hartz.

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SEWARD SMITH

PROJECT RIM (Restricted, Isolated, Monotony)

1. INTRODUCTION

In the Fall of 1968 a comprehensive investigation into the psychological and physiological effects of long-term isolation and confinement began in the Behavioral Sciences Department of the Naval Medical Research Institute. This study represented the culmination of Project ARGUS, a seven year program of research investigating performance effectiveness of small crews in future weapons systems. The purpose of RIM was to incorporate the findings of Project ARGUS, and more specifically to investigate long-term monotony and boredom, in order to establish a bank of information which is necessary for the design and implementation of lengthy missions such as those proposed by NASA and future Navy projects.

The purpose of this paper is to provide comprehensive documentation of the research rationale and procedures for Project RIM. It is intended primarily as a reference document to answer broad as well as detailed questions that cannot be answered thoroughly in the limited space of a journal publication. No research data results will be included in this paper. The various data areas of this small-group confinement study will be detailed in articles as analyses are completed.

Basically Project RIM was an in-depth analysis of the behavior of 2 and 3-man groups in a 21-day period of crowded monotonous confinement. Included in the experimental design were four independent variables: Group size, Crowdedness, Inter-personal Compatibility, and Seniority of Leadership.

#### A. EXPERIMENTAL VARIABLES

1. Group Size - Groups of two and three men were utilized as a logical extension of the previous research done within Project ARGUS. Prior to this study investigations have been limited to single individuals in isolation (Smith & Myers, 1967; Smith, Myers & Johnson, 1967; Johnson, Smith, & Myers, 1968; Myers, Johnson & Smith, 1968) and two man groups (Altman, & Haythorn, 1965; Haythorn, Altman & Myers, 1966; Altman, & Haythorn, 1967; Taylor, Wheeler, & Altman, 1968; Taylor, Wheeler, Altman & Kushner, 1969). Further consideration for the 3-man group stems from the fact that in future systems larger crews will be essential in carrying out these missions. Since dyads and triads generally form the basic units of larger groups it was felt that a detailed analysis of the interpersonal relationships involved in these types of groups would be of importance.

Each run consisted of four 2-man groups and two 3-man groups. This imbalance was dictated primarily by the limitations of the laboratory layout.

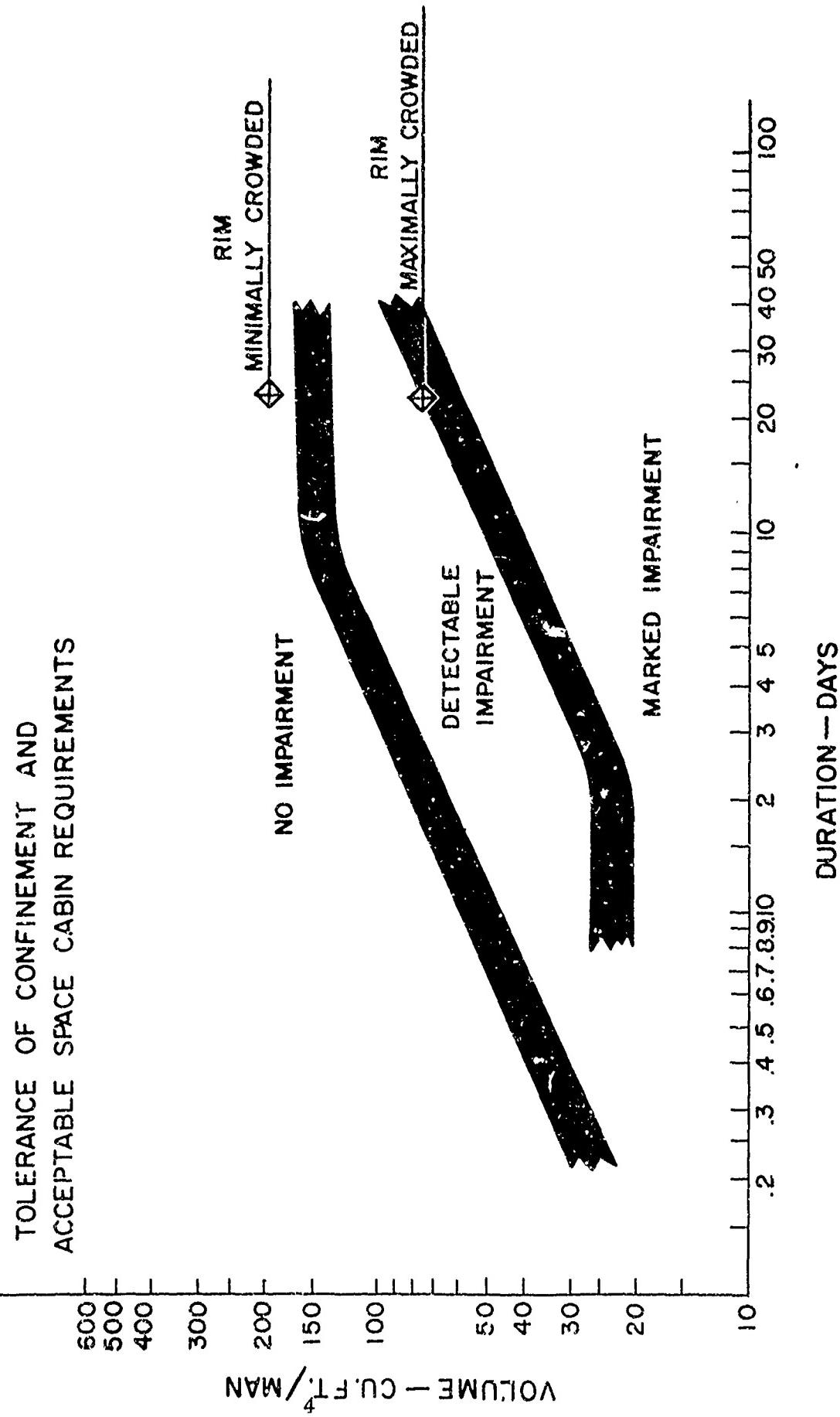
2. Crowdedness - This manipulation involved two levels of space available. One was a maximally crowded condition where, although each subject had his own bunk, there was limited storage space, and the joint work space scarcely permitted exercising even when only one man occupied this space and room chairs were placed out of the way. In this condition there was an average of approximately 70 cu. ft. of usable space per man. The second condition (minimally crowded) afforded approximately 200 cu. ft. of space per man, including more storage areas and a larger jointly usable space. In the more crowded condition moving about without "bumping elbows" was

difficult. Actually both conditions were crowded, representing considerably greater crowdedness than has been employed in previous ARGUS studies (70 - 200 cu. ft. as compared with 500 - 1000 cu. ft.). The rationale behind the allotment of 70 and 200 cu. ft. per man was derived from a model of acceptable space and tolerance for confinement which was developed by Frazer (1966). According to Frazer's model, (See Figure 1) for a duration of 21 days an allotment of 200 cu. ft. per man exceeds the threshold of acceptable space and no psychological or physiological impairment would be expected. An allotment of 70 cu. ft. in Frazer's model lies between the areas where detectable and marked impairment have been recorded. The decision to investigate these particular space provisions was made in terms of limits of the laboratory facility and estimations of the type of vehicles and habitats that will be available in the near future.

3. Seniority of Leadership - Each group consisted of a group leader and one or two followers. In half the groups, leaders were assigned from higher ranking experienced men (E-4 through E-6); in the remaining groups non-rated men (E-2 and E-3) were classified as leaders. The inclusion of the leadership variable was dictated by fleet priority assignments which rendered many senior volunteers unavailable.

4. Interpersonal Compatibility - Group assignments were made utilizing a crew compatibility composition procedure. The group composition task was to assemble the most and least compatible sets of six groups (four dyads and two triads) from a fixed pool of 14 men previously divided by rank into two groups of six leaders and eight followers.

Fig. 1



This composition procedure used as data from each of the 14 men, their Expressed and Wanted Control and Affection scores from the FIRO-B (Schutz, 1958) and the Need Achievement Score from the Edwards Personal Preference Schedule (EPPS).

The theory of group compatibility underlying the manipulation is a combination of that advanced by Schutz (1958), and Haythorn (1969). The particular variables selected for inclusion in the compatibility computation were determined primarily by results of previous ARGUS projects (Haythorn, Altman and Myers, 1966; Altman and Haythorn, 1967).

A mathematical formula combining these variables was derived from this data based theory, and a digital computer examined all of the 151,200 possible combinations of the 8 followers with the 6 leaders to compose four groups of 2 men and two groups of 3 men. A printout was provided of the 10 "most compatible" combinations and the 10 "least compatible" combinations. During the experiment, half of the runs utilized compatible crew compositions, and half employed incompatible groupings.

These four variables were combined into a  $2 \times 2 \times 2 \times 2$  research design (see Figure 2). The number of groups run per cell is shown, which represent a total of 1,176 man-days of isolation (excluding two pilot study runs).

#### B. CONDITIONS OF THE EXPERIMENT

The conditions for Project R&L were designed to provide an environment that would focus on boredom and monotony. This was based on the premise that crews on long-term missions would be likely to experience

Fig. 2

COMPATIBLE		LESS COMPATIBLE		SENIOR LEADER		JUNIOR LEADER		2 MEN		3 MEN		2 MEN		3 MEN	
CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED	CROWDED	LESS CROWDED
2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD	2 PAIRS	1 TRIAD
2		2		2		2		2		2		2		2	
PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD	PAIRS	TRIAD

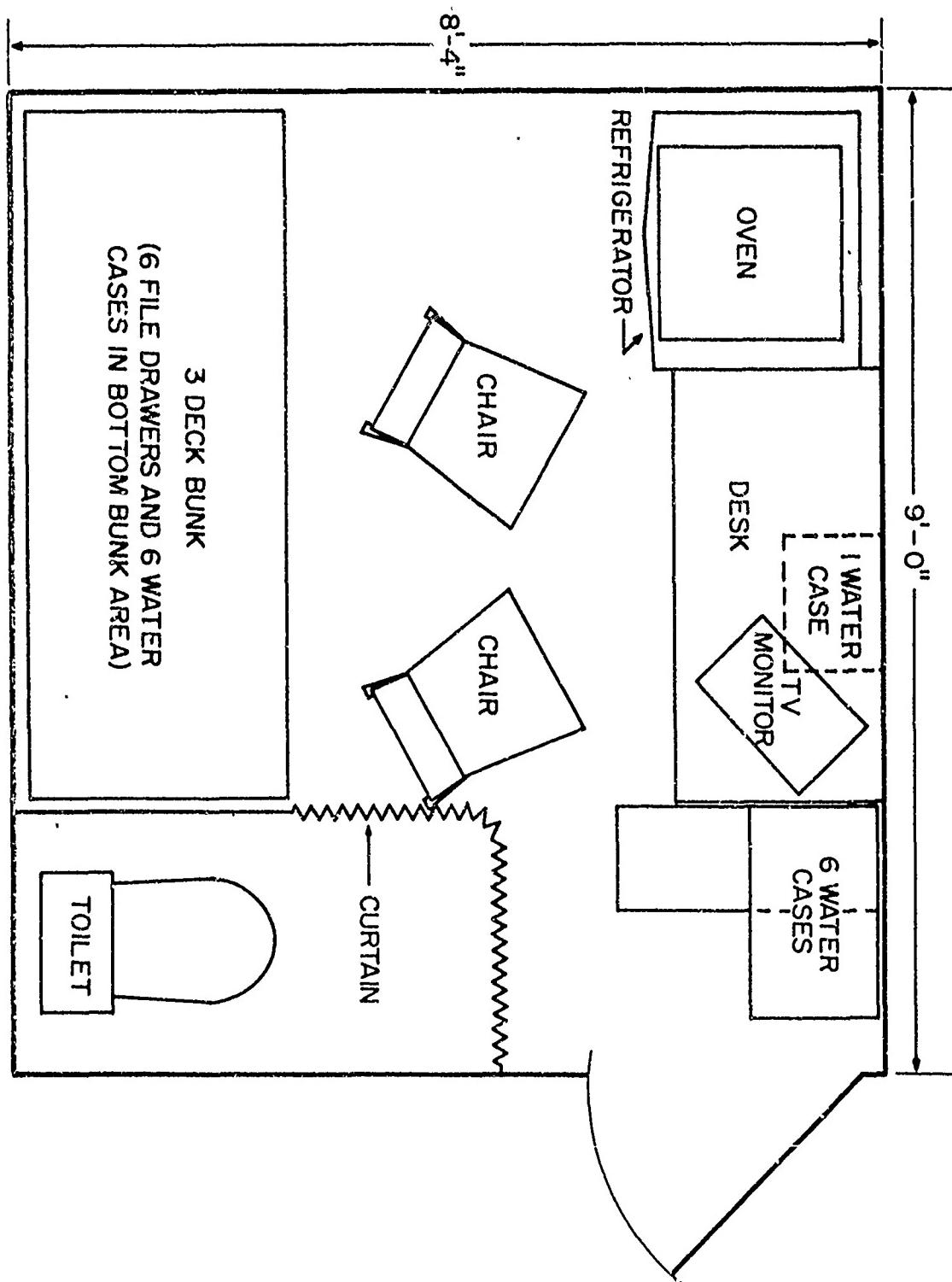
difficulty particularly during lengthy portions of their missions when they had very little to do. Therefore, during the experiment there was a concerted effort to minimize filled time. There was very little entertainment allotted; the subjects had no books, TV's, or radios. The only daily scheduled item was a task and/or questionnaire session which occupied only a small portion of the day (10 ~ 150 minutes depending on the testing schedule). Clocks and calendars were provided so that subjects could maintain time orientation.

## II METHOD

### A. LABORATORY FACILITY

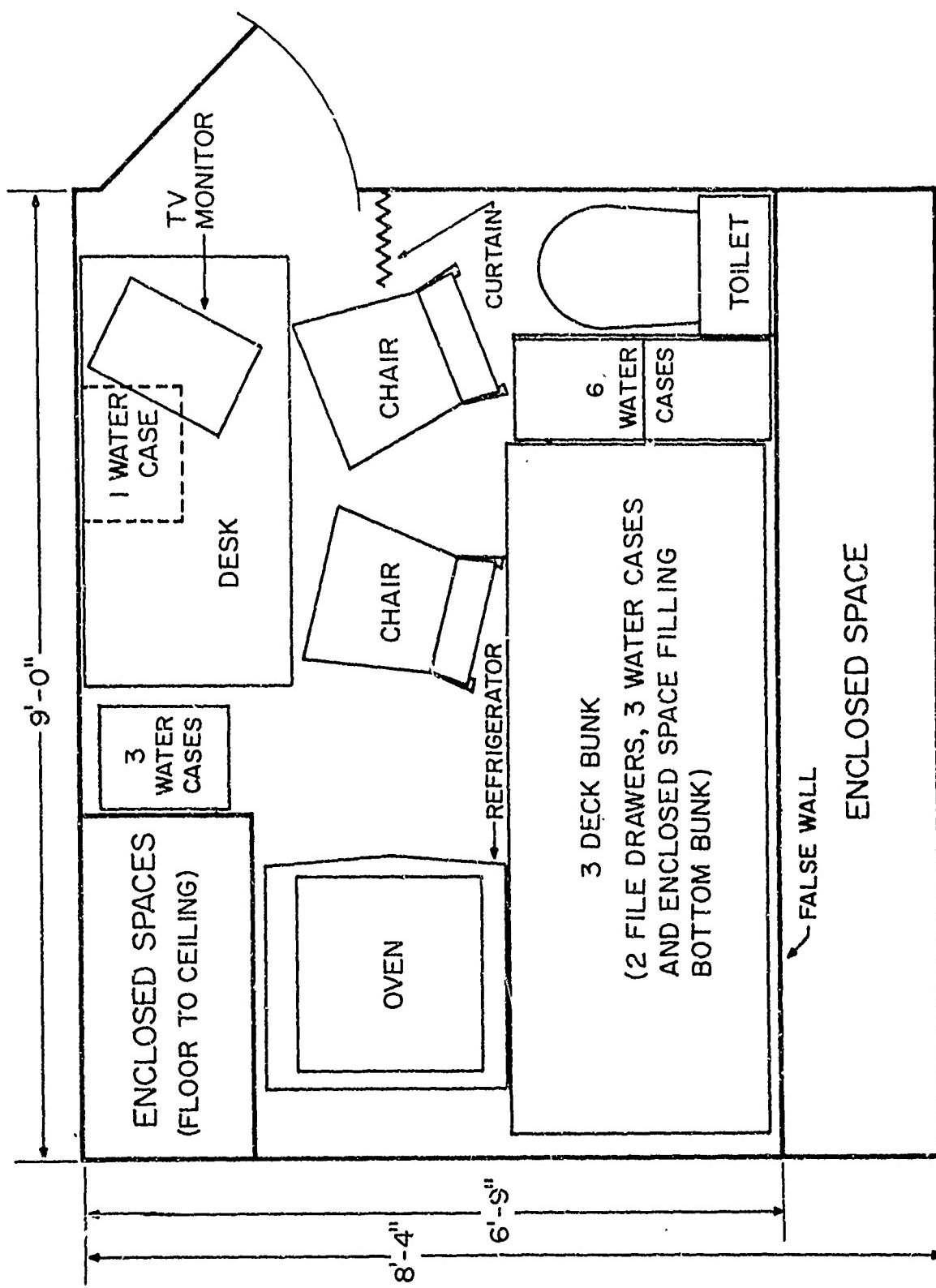
In order to create conditions of isolated crowded confinement the "Deep Isolation" laboratory at the Naval Medical Research Institute was converted for the use of Project RIM.

A general description of the control room and experimental chambers is available in a previous report (Smith, Myers, & Edmondo, 1967). Due to the different mission of the present project some changes and additions have been made. The purpose of this section is to provide a detailed description of the laboratory facility and the data-gathering operations designed for Project RIM. Figures 3, 4, 5, 6, and 7 show the different room floor plans utilized in RIM; Figure 8 shows the general laboratory layout. Each room contained essentially the same furniture items. The space conditions were varied using different sized rooms and false walls. Triple-stacked bunk beds, specially constructed to approximate the dimensions of submarine bunks, allowed each man an equivalent amount of



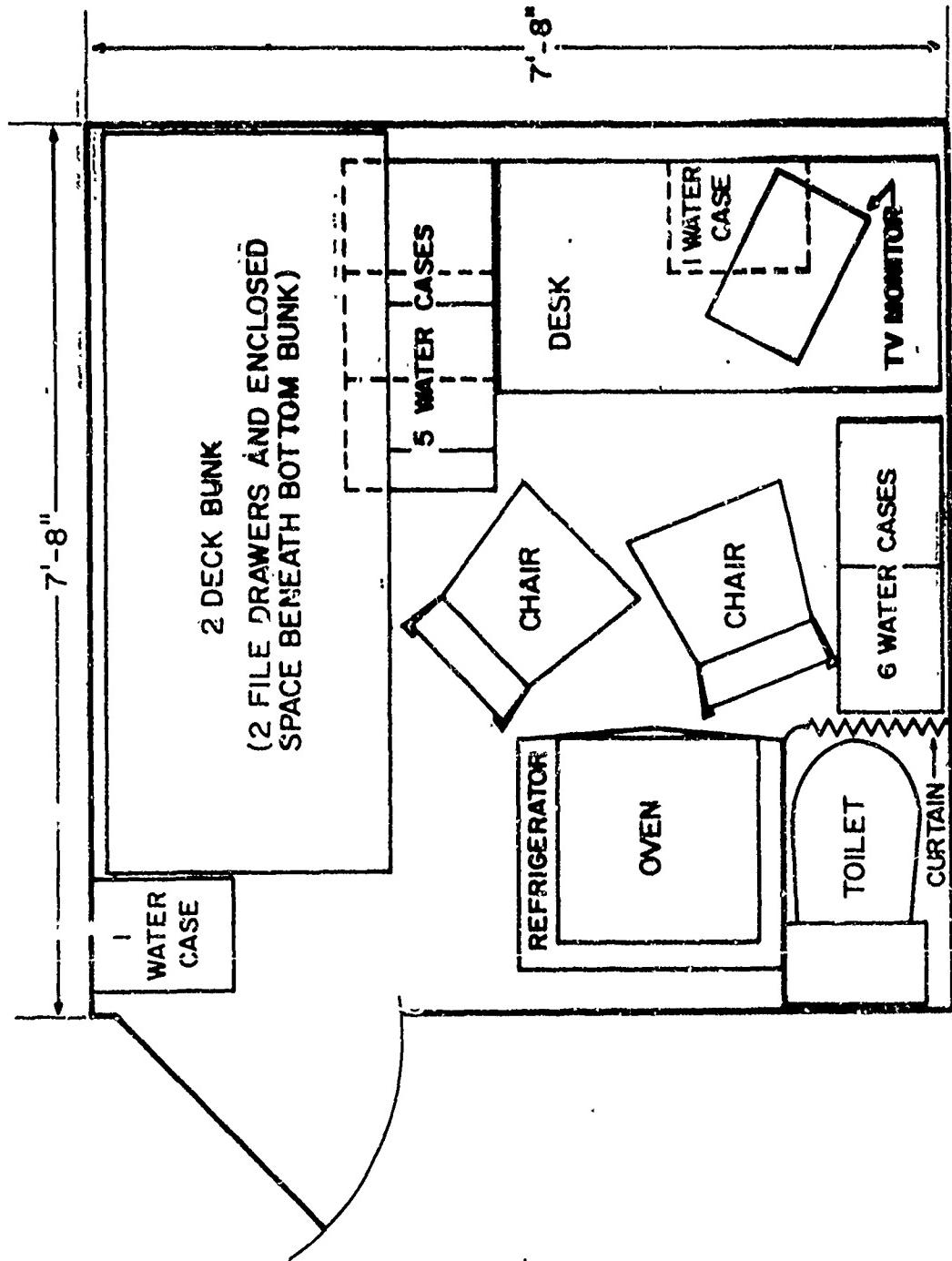
2 MAN UNCROWDED ROOM

Fig. 3



2 MAN CROWDED ROOM

Fig. 4



2 MAN CROWDED ROOM

FIG. 5

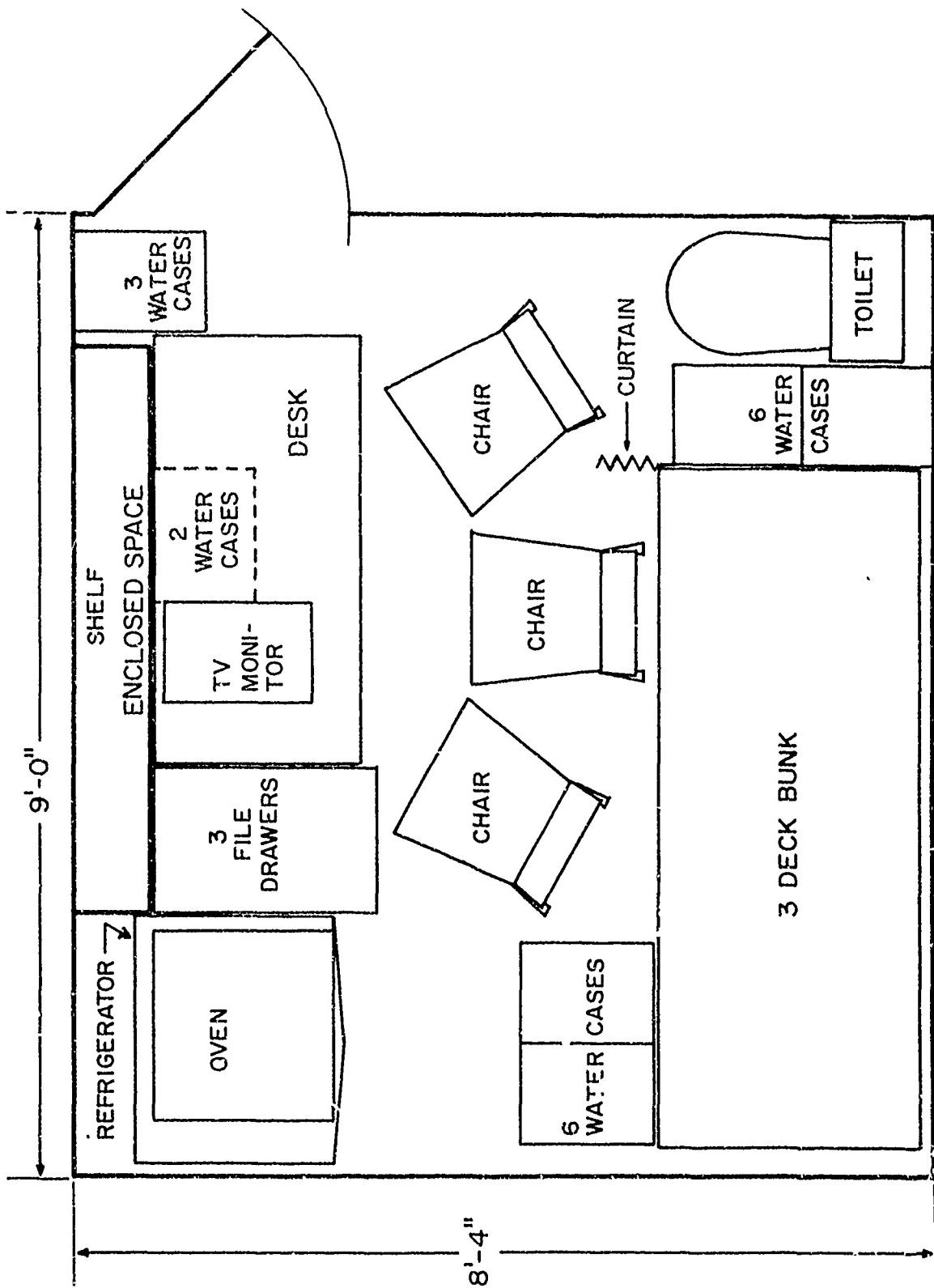


Fig. 6

### 3 MAN CROWDED ROOM

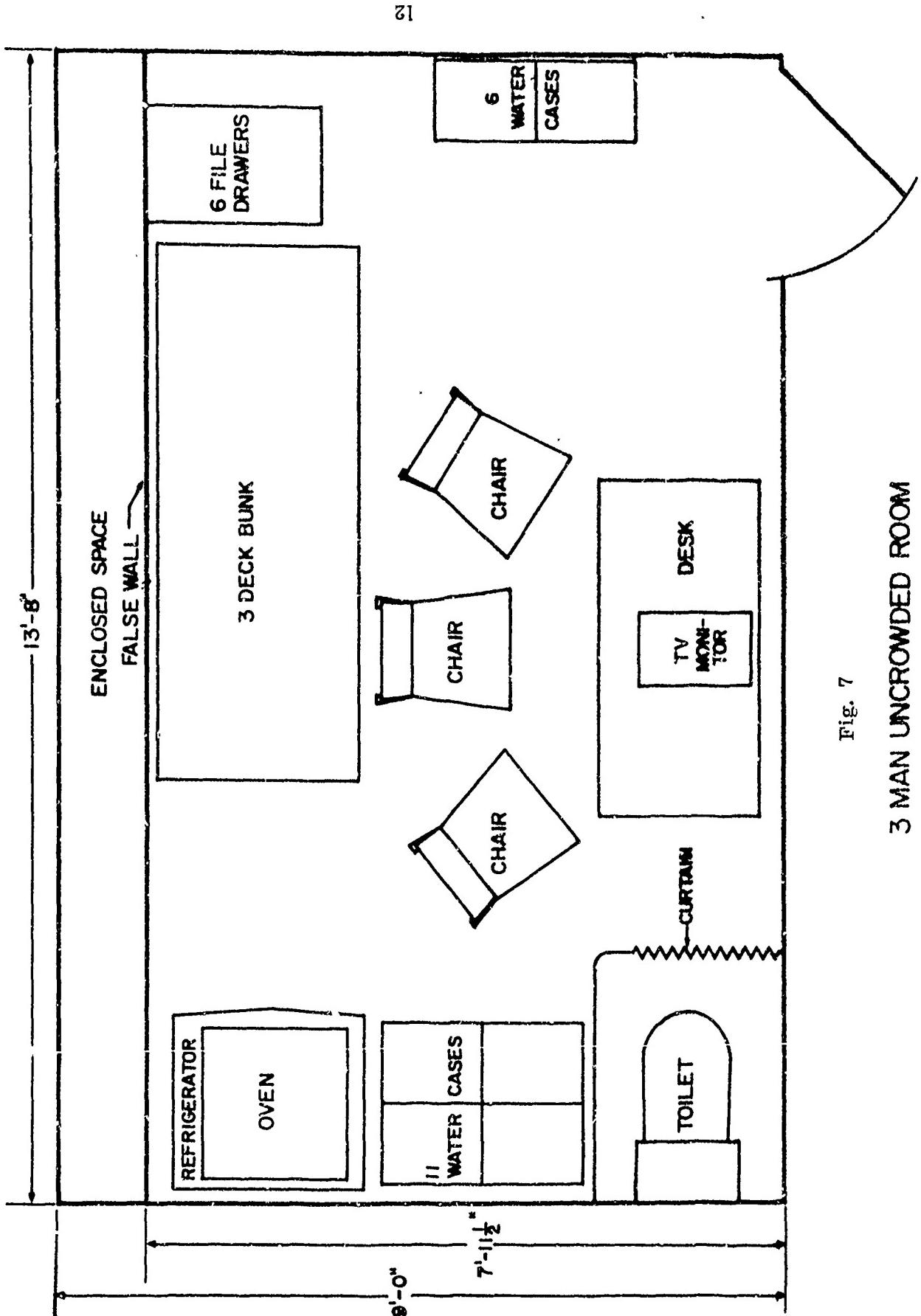
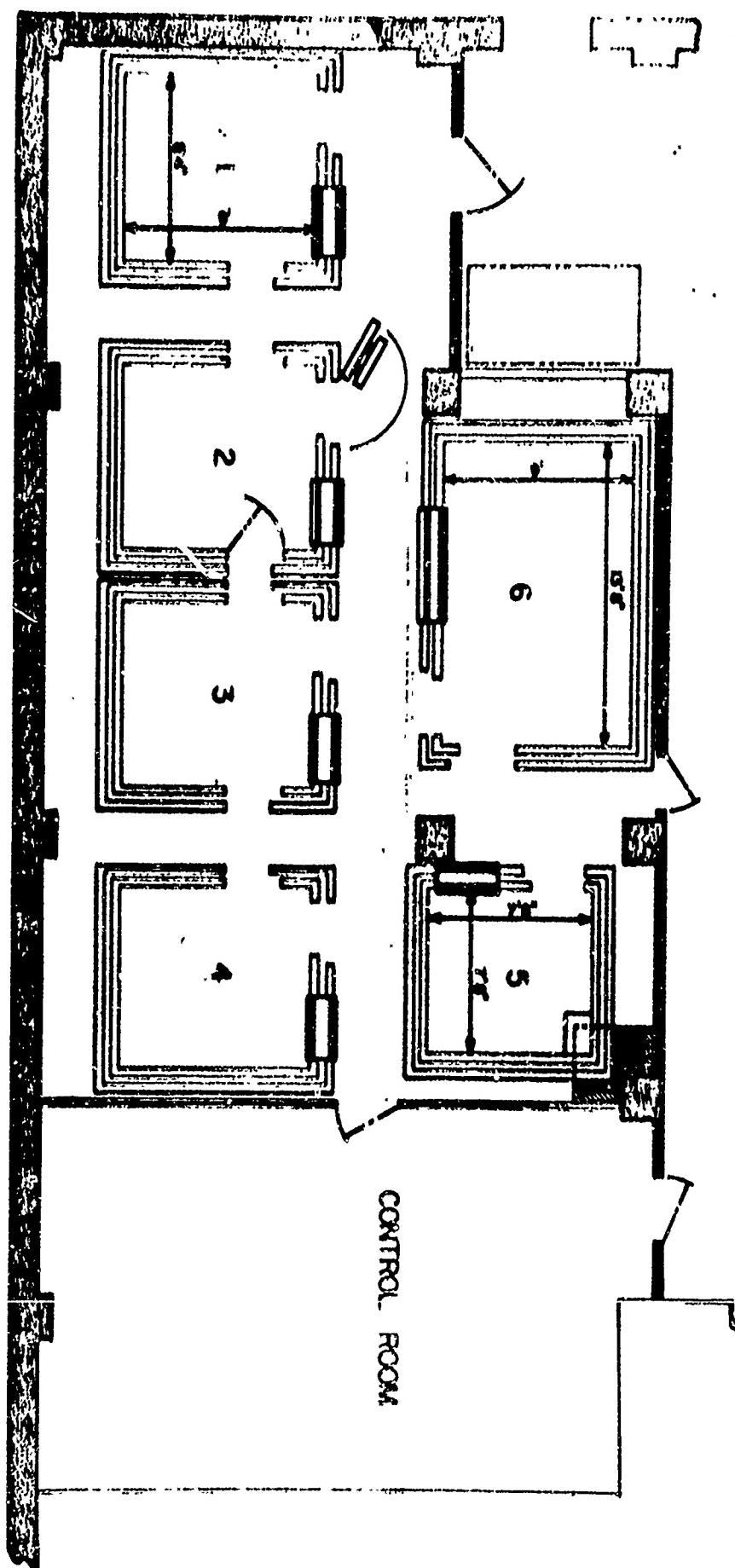


Fig. 8 Laboratory Layout



the tiny space. Due to the unusual construction of Room 5, a double bunk bed was erected over a stanchion which projects into the room.

Regardless of condition, each man was provided with his own bunk (30" x 72"), and his own padded non-folding chair. Each room contained one (2' x 4') community-office-type desk which also served as a table. The number of storage file drawers allotted per man was the only difference in the room furnishings between the crowded and uncrowded conditions. In the two-man rooms these cardboard drawers were fastened to the frame of the lowest bunk in order to render this space unusable for bunking. The remaining space in this bunk was used for water storage.

As the rooms have no running water the subjects were provided with an ample supply of bottled water. Each man was allotted 18 gallons of water, contained in cases of one-quart bottles. There were no washing facilities other than a small plastic wash basin. Each subject had his own basin and used the bottled water to bathe.

The only toilet facility provided was a "Sears" chemical toilet, which consisted of a toilet frame and a 6 1/2 gallon can which was placed inside. This receptacle can was lined with a heavy-duty plastic bag and partially filled with water. A chemical compound in a water-soluble packet (similar to household dry bleach packets) was added to the water in the can each day to control bacteria and odor. This chemical packet, the Celeste "Sani-pac," contained a disinfectant and a deodorizer. An ample supply of these chemical packets was provided. Ss were requested to urinate into a funnel arrangement which was mounted on the wall next to the chemical

toilet. The funnel arrangement led to the outside for 24-hour urine collection. The system consisted of individual 2" diameter nalgene funnels with 1/4" tubes running through the double walls to the outside into a collection vessel.

Previous isolation research has consistently demonstrated the importance of good food in maintaining the incentive of confined personnel. The diet for Project RIM was specially prepared by the Macke Company to be varied, tasty, easily prepared, and "interesting." Most of the meals were pre-cooked and frozen, however, various types of dry packaged foods were also offered. Frozen and cold storage foods were kept in a standard 12 cubic foot Hotpoint refrigerator. Food was quickly prepared in the Litton-500 microwave oven, which is capable of heating an entire meal in less than 60 seconds. A typical day's menu consisted of:

Breakfast:	Grapefruit sections Grilled pork sausage with applesauce and grits English muffin with butter Coffee, sugar and cream
Snack:	Fresh apple
Lunch:	Corned beef sandwich on pumpernickel, mustard and horseradish Potato chips Tea with sugar
Snack:	Candy bar
Dinner:	Roast sirloin of beef au jus Hash browned potatoes - Mexican corn Bread and butter Cream puff Coffee, sugar and cream

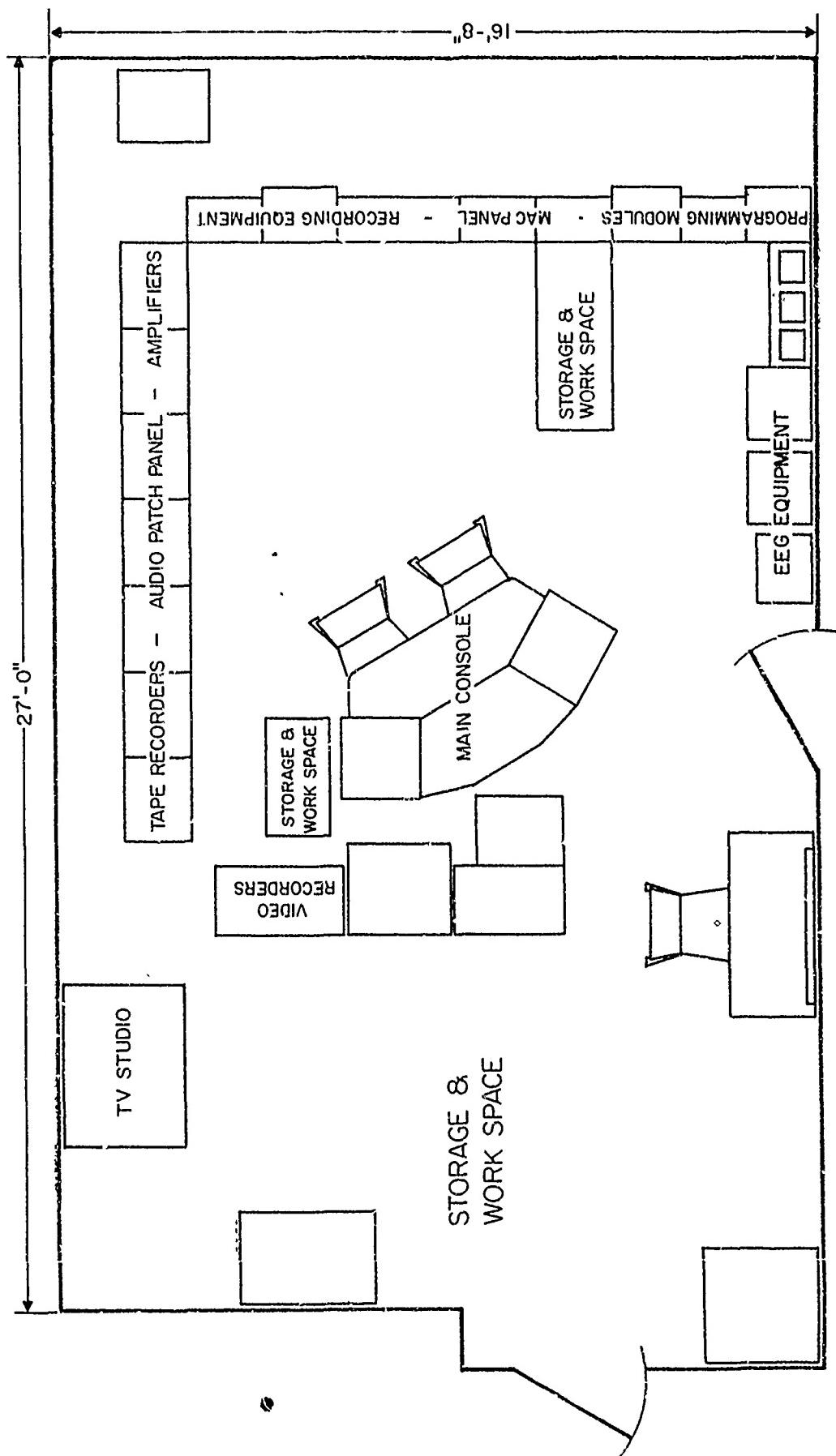
Very little was offered in the line of recreational material. Only writing paper, playing cards, and a chess and checker set were provided. Exercise equipment consisting of an elastic chest-pull and hand grips were included in the room furnishings in order to reduce the possibility of muscle atrophy.

The room situations afforded very little privacy. The toilet area, which could be enclosed if the curtain was drawn, was the only area where a subject could not be seen by others.

The room temperatures were maintained in the range of 68° - 72° Fahrenheit. The total volume of air in each room was exchanged approximately every three minutes. This exchange reduced odors to a minimum.

Due to the limited capacity of the refrigerator and toilet, re-supply of food and chemical toilet was conducted three times during the mission on days 5, 10 and 15. All other items for the 21-day mission were contained within the room at the start of the mission.

Observations of and communication with the various chambers were made in a number of ways. In each of the rooms there were two microphones suspended from the ceiling and four loudspeakers were mounted on one wall near the door. An Ampex TV camera with a wide-angle lens, which provided a good picture of the entire room, was mounted on the ceiling in one corner of the room. A 9-inch Conrac TV monitor sat on the desk and was used in the presentation of test stimuli. The apparatus described provided excellent monitoring capabilities with capacity for both audio and video two-way communication. Additional jacks were mounted on the walls



CONTROL CENTER

Fig. 9

for earphone and boom-mike connections. Each man was provided with a three button response box which was connected to a junction box on the wall via a 6 foot tether cable.

B. CONTROL CENTER

The control room of the deep isolation laboratory is a highly automated facility with extensive programming facilities. Figure 9 shows the layout of the control room. A complete conversion of programming facilities from electromagnetic to solid-state equipment had been completed. Included in the new equipment is a 5000 pin MAC panel assembly from which virtually every piece of equipment in the lab can be controlled and operated.

A 3-sectioned control console is the main site for safety monitoring and data collection (see Figure 10). Located on the right panel of the console are 6 (9 inch) CONRAC TV monitors mounted in pairs (3 high). These monitors provided video pictures from each of the 6 rooms.

The left panel of the console contains audio-related equipment including remote controls for 6 tape recorders, speaker listening switches, and sound meters. An observer had the capability of listening to any or all of the rooms on either earphones or separate speakers. Tape recorders, one per room, were always kept in a ready state to record any verbal behavior deemed necessary.

Mounted above the Audio Listen System were the "room-light" dimming switches. These switches controlled the light levels within the experimental chambers. Lights in the rooms were kept on throughout the project, but were dimmed at night to the minimum level that would still permit a strong video signal. Also contained on this left panel was a series of alarm indicators which signaled the opening of a chamber door.

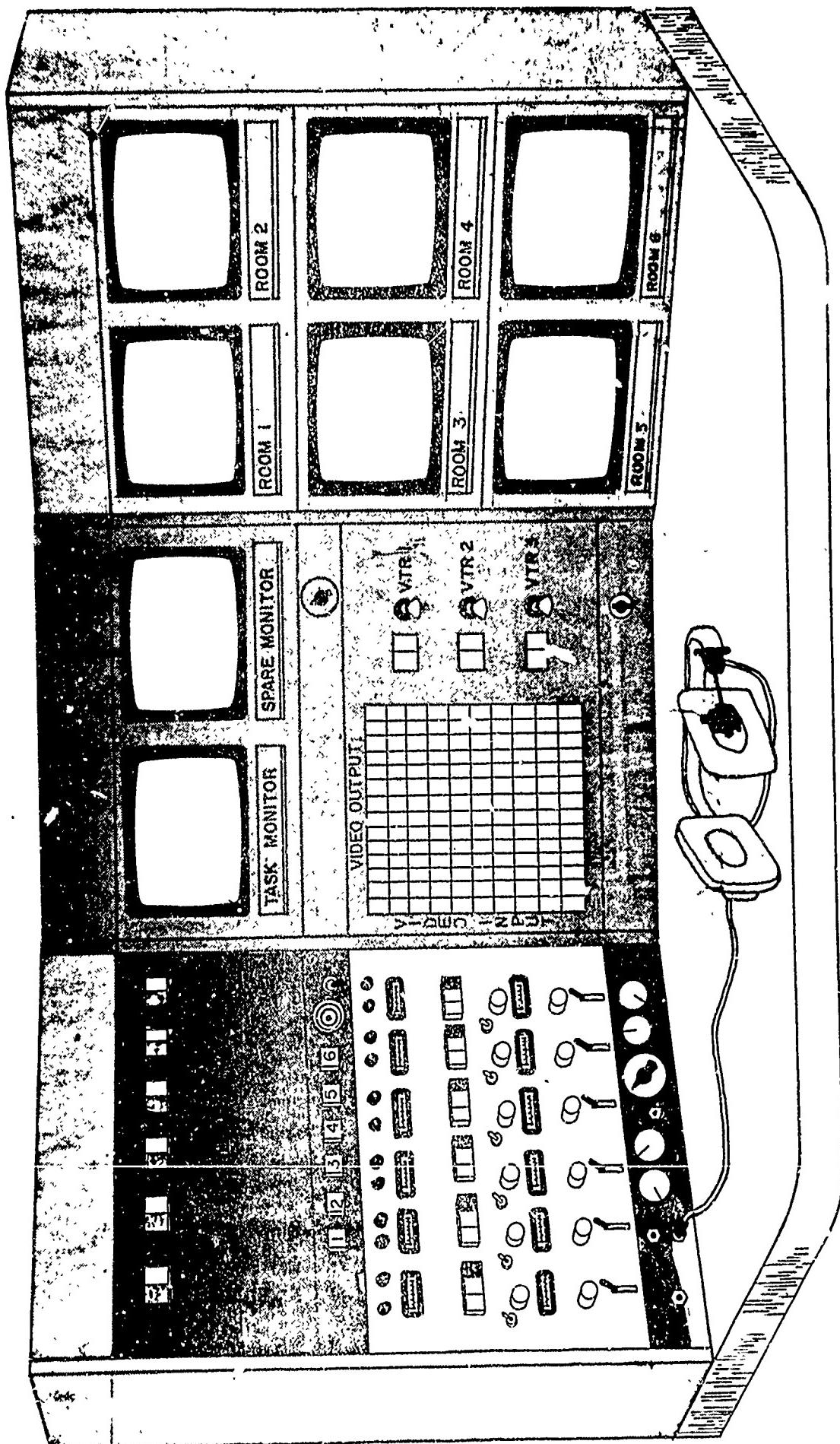


Fig. 10 MAIN CONSOLE

On the center panel of the console were mounted two extra 9" video monitors which were used in the task and questionnaire presentation. The lower part of this panel contained a large (10 x 14) video-switching matrix, and remote controls for three Ampex 7500 video tape recorders. This switching matrix provided the capability of sending a video signal to any receiver desired. Video tape recordings of ongoing behavior were made by switching the outputs of room cameras to the video tape recorders. A video sampling system was designed to sample and record behavior automatically on a pre-programmed schedule. Using a twenty-four hour clock, a sampling sequence was triggered 16 times a day (see Figure 11). Each video sample consisted of a time-day code and a twenty-second sample from each room. The entire switching sequence was programmed automatically and no manual operations were involved. However, this sampling sequence could be started manually at any time.

Tape recorded tasks and questionnaires were played into the room monitors from the video recorders also using this switching matrix. Almost all tasks and questionnaires were presented via the closed circuit TV system. A "TV editorial" method of presentation was utilized where instructions and task items moved slowly from the bottom to the top of the TV screen. This effect was achieved by typing the tasks and questionnaires on rolls of paper which were placed on a variable-speed paper drive. This apparatus was placed in front of a TV camera and the material was video taped as the paper moved by the camera lens.

In other parts of the Control Room several recording devices were available for use in task monitoring. Three twenty-pen Esterline-Angus

Fig. 11.  
DAILY SCHEDULE

<u>TIME</u>	<u>BEHAVIOR LOG 1 HOUR SAMPLES</u>	<u>AUTOMATED VIDEO SAMPLES</u>	<u>FREE INTERACTION</u>	<u>ROOM LIGHTS STATUS</u>	<u>TIME</u>
0800		_____			0800
0900	[ ]	_____			0900
1000		_____			1000
1100		_____			1100
1200		_____	[ ] 15 MIN SAMPLES		1200
1300	[ ]	_____			1300
1400		_____			1400
1500	[ ]	VIDEO SAMPLES DURING DAILY TEST SESSION		BRIGHT	1500
1600		_____			1600
1700		_____	[ ] 15 MIN SAMPLES		1700
1800		_____			1800
1900	[ ]	_____			1900
2000		_____			2000
2100	[ ]	_____			2100
2200		_____	[ ] 15 MIN SAMPLES		2200
2300		_____			2300
2400		_____			2400
0100	[ ]	_____			0100
0200		_____			0200
0300	[ ]	_____		DIMMED	0300
0400		_____			0400
0500		_____			0500
0600		_____			0600
0700	[ ]	_____			0700
				2315	
				DIMMED	
				0745	

recorders were designed to receive inputs from the individual subject response boxes located in the rooms. Two multiple channel Franklin counters were designed to receive inputs via the MAC panel assembly and associated systems.

The EEG recording system consisted of two Beckman/Offner dynagraphs yielding a capability of recording on 12 independent channels. The dynagraphs were coupled with an Ampex (SP-300) seven channel AM/FM magnetic tape recorder via a small MAC panel assembly. EEG signals were carried from the subjects' rooms to the dynagraph using shielded cable. The EEG could be further monitored by means of separate TEKTRONIX oscilloscopes which could be wired to receive the EEG signal via the small MAC panel.

#### C. SUBJECTS

The subjects in Project RIM were enlisted Naval personnel who participated on a volunteer basis. The men, recent graduates from Navy "A" and "B" schools, were recruited from Naval bases at four locations: San Diego, California; Great Lakes, Illinois; New London, Connecticut; and Bainbridge, Maryland.

The volunteering process, an extended procedure, was designed to screen out all but the most serious volunteer. Request for volunteer notices (see Appendix A) briefly describing the project were posted on bulletin boards at these bases. Interested personnel sought additional details (see Appendix B) and specific volunteering instructions by initiating contact with a field personnel officer. A cash incentive award (\$75 or \$100 depending upon pay grade) was offered to increase the size of the volunteer pool. All volunteers were screened by the Bureau

Table I

PROJECT ARGUS STUDIES					
	DYAD	ICARUS	COMONOT	WHAT	RIM
2-man group confinement in lighted rooms N=36	Individuals in dark, quiet isolation N=90	Individuals in dark, quiet isolation N=126	2-man group confinement in lighted rooms N=70	2 or 3-man group confinement in lighted rooms N=81	2 or 3-man group confinement in lighted rooms N=81-25=56*
Mean age	18.4	18.5	18.6	20.9	20.8
Age Range	17-21	17-22	17-19	17-20	18-32
Mean GCT	49.9	58.9	55.8	51.7	61.8
GCT-Range	46-59	53-71	49-74	48-55	41-75
Pay Grade Range	E2	E2	E1-E2	E1-E2	E2-E6
Months in Service	6	6	6	6-132+	6-132+
Education Range(years)	8-13	9-14	9-13	11-13	8-18
% High School Graduates	---	87	84	97	95
Days in Isolation	10	1	7	8	21

\* Most of the data areas to be reported will be based on data from 56 Ss. The earlier Ss contributed primarily pilot study data.

of Personnel for fleet priority requirements. This process resulted in 81 subjects being assigned to Bethesda to participate in the project. Table 1 summarizes the biographical characteristics of the RIM subject population, and some of the previous ARGUS studies.

In general RIM utilized an older, better educated, more highly trained, and more intelligent group of subjects than had been available for previous project ARGUS experiments.

### III. PROCEDURE

In order to complete the experimental design, several essentially equivalent "Run" cycles were conducted. Each Run involved approximately thirty-three days time divided into:

- A. Six to seven days of "Pre-confinement" procedures
- B. Twenty-one days in confinement.
- C. Four to five days of "Post-confinement" activities.

The following section is a description of the various activities the subjects experienced during this thirty-three day period.

#### A. PRE-CONFINEMENT WEEK

For each Run, Ss were ordered to report to the Naval Medical Research Institute on the Monday or Tuesday of the "Pre-Confinement" week. Upon arrival, Ss were assigned to a barracks area, and received an information packet (see Appendix C) containing a general orientation to Project RIM.

When all Ss had arrived, an overall briefing (see Appendix D) was given to the entire group of Ss. Project personnel were introduced and questions were answered. A schedule of the week's activities was presented

at this time (see Appendix E). Following this group briefing, the questionnaires used to measure compatibility (FIRO-B, EPPS) were administered. These data were processed immediately and group composition was completed by the following morning which yielded information necessary to carry out further pre-confinement testing. The subjects, however, knew nothing of the group compositions until they entered the chambers for the start of the mission.

Beginning on Tuesday, all Ss underwent routine physical and psychiatric examinations. They were also briefed (see Appendix F) in an isolation chamber about details of the Project and mechanics of living for 21-days in isolation. In order to minimize Ss awareness of the crowdedness manipulation only one chamber (the largest) was employed in pre-confinement activities. For the remainder of the "Pre" week, Ss were involved in the following types of activities:

1. Baseline Physiological Measures

a. Three morning fasting blood samples were taken to provide baseline information on various different biochemical factors. Some of the factors of most interest were:

- 1) Lipoprotein Electrophoresis Distribution
- 2) Haptoglobin
- 3) Total Lactic Dehydrogenase (LDH)
- 4) LDH Isoenzyme Distribution
- 5) Total Creatinene Phosphokinase (CPK)
- 6) Neutral Lipids
- 7) Glycolipids
- 8) Phospholipids
- 9) Free Fatty Acids
- 10) Glucose
- 11) Lactic Acid

b. During one 24 hour resting period all urine output was collected to provide baseline data on stress related factors such as:

- 1) Epinephrine
- 2) Norepinephrine
- 3) Cortisol
- 4) 17 Hydroxycorticosteroids

c. During this "Pre" week, each of the group leaders received training in the preparation and placement of the EEG electrodes. Two or three men per run participated in the EEG sub-study. These men spent three nights during "Pre-confinement" week sleeping in Chamber #6 where continuous seven hour baseline samples were taken. All other Ss remained berthed in the barracks during this week.

## 2. Baseline Psychological Measures

The purpose of the pre-confinement battery of questionnaires was to provide a description of the subject population in terms of personality and personal history and to establish pre-confinement baseline measures against which "during" and "post" measures of performance and adjustment could be assessed. Table 2 presents a summary schedule of the Questionnaire Battery

During the initial briefing, instructions were provided as to the use of the questionnaire booklets and IBM answer sheets. The major portion of the pre-confinement questionnaire battery (as well as the "during" and "post" batteries) was answered on standard IBM answer sheets. Punched cards were generated from these sheets for computer processing. This capability made it possible to collect and analyze a large mass of data rapidly and efficiently.

In addition to the paper and pencil measures, each S was tested for field-independence on the Rod-Frame apparatus.

3. Recreational Activities

Each night Ss had approximately two hours of free time before lights out. Considerable recreational materials were provided in the barracks area (TV, pool table, ping-pong, etc.). At 2000 hours Saturday, subjects were given 24 hours liberty with orders to return by 2000 hours Sunday.

B. DURING CONFINEMENT

1. General Scheduling

Subjects entered the chambers at 0800 Monday morning with the room and group assignments having been made according to the compatibility composition procedure. For the following 21 days of confinement the only intrusions into the isolated environment were a daily task and questionnaire session and the five-day re-supply cycle.

The task and questionnaire session began daily at 1420 hours with a request for all subjects to void their bladders. This provided the terminal point for the previous 24 hour sample. These sessions ended with a daily medical report. The duration of these intrusions varied with the testing schedule, ranging from ten minutes to two and one-half hours.

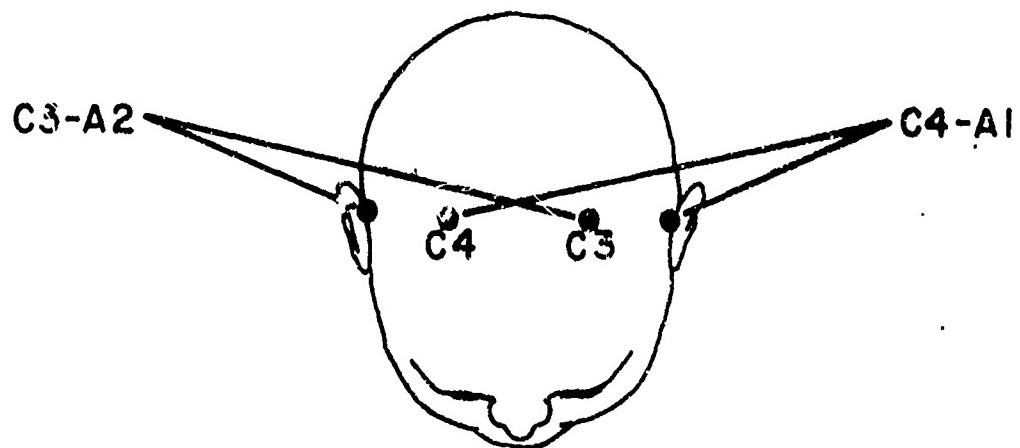
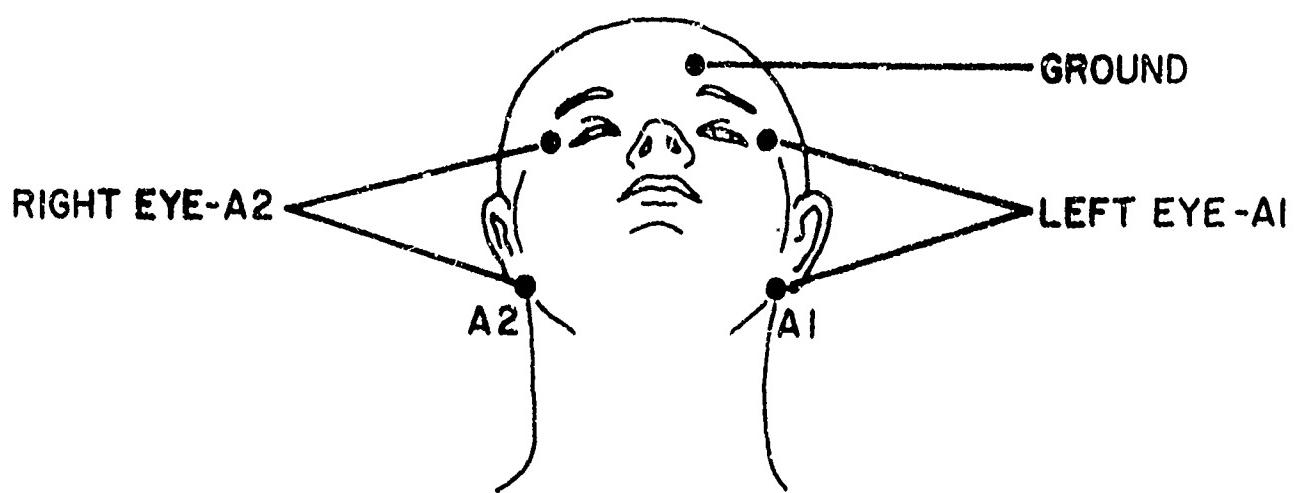
The re-supply procedure was carried out after completing the questionnaire and task session on days 5, 10, and 15. The items re-supplied involved food (both dry goods, and refrigerated foods), and a fresh toilet receptacle can. The items removed during re-supply included: completed IBM answer sheets, soiled laundry, trash, and the used toilet receptacle.

The re-supply method was carried out in two steps: 1) The items to be re-supplied were placed in the hall outside the chamber door. 2) Each room was signaled individually to open its door and bring in the new supplies. Waste materials were then placed in the hall and the chamber door was closed. During this procedure the chamber door remained open for approximately one minute. Signals to the rooms were staggered so that contact was never made with other subjects or staff personnel during this procedure.

Throughout the 21 days all other activities (e.g., eating, sleeping, etc.) were unscheduled and subjects were free to do as they wished.

## 2. During-Confinement Sleep Study

During the 21 day confinement a sub-study was carried out investigating the EEG sleep patterns (e.g., Alpha Rhythm, REM, Delta Waves) of ten of the isolated men. Due to limited equipment, only two or three men per run (always in separate rooms) were included in the sub-study. The subjects used Grass electrodes (pasted on) which were cabled to a multi-pin connector that could be carried in the shirt pocket. To hook up with the recording equipment, the subject plugged this connector into a bedside receptacle which led to the EEG apparatus. This arrangement allowed the EEG subjects to unplug themselves and move about without having to remove the electrodes. Electrode placements (see Figure 12) included: Right Eye - Right Mastoid, Left Parietal - Right Mastoid, and Right Parietal - Left Mastoid, Left Eye - Left Mastoid. EEG rooms were provided with a kit which included special equipment (Ohmmeter, paste, electrodes, acetone, etc.) to handle any problems.



## EEG ELECTRODE PLACEMENT

Fig. 12

Continuous EEG tracings were recorded during confinement on the following schedule: days 1-3, 10-12, and 18-20. Subjects were requested to wear their electrodes during these days and to "plug-in" whenever they were on the bed. When recording problems occurred, a tone was played into the room to alert Ss to watch the TV monitor for instructions. Written instructions to correct any problems were relayed in this manner.

### 3. Data Collection

Responsibility for the collection of much during-confinement data was delegated to the observer staff. This staff consisted of fifteen undergraduate and graduate students who had considerable psychological training. These observers worked on eight hour shifts, working in pairs, except for the early morning hours during which only one observer was on duty.

The safety and general well-being of the subjects was one of the principal concerns of this trained observer staff. They also systematically collected observational data in the control center by monitoring audio and video displays of the six rooms. The observers completed data forms and logs, and recorded audio and video samples. The observational data collected consisted of the following:

- a. Behavior log
- b. Automated video samples
- c. Manual video samples
- d. Free interaction samples
- e. Unusual events log
- f. Re-supply log
- g. Observer rating forms

The observational data were collected to yield information on individual and group behavior patterns and Ss' methods of adaptation to isolation. Data collection forms are presented in Appendix G. The remainder of this section consists of brief descriptions of each of the data collection techniques used.

a. Behavior Log

At pre-selected periods, observers systematically recorded information for each subject on five behavioral categories:

- 1) Type of activity the S was engaged in
- 2) Location in the room.
- 3) Talking
- 4) Desocialization
- 5) Violations of mission rules

For a listing of the sub-categories for each of the above categories see Appendix H. Measures derived from the behavior log will include:

- 1) Indices of territoriality (e.g., desk, chairs and room)
- 2) Alone vs. together activity
- 3) Restlessness (general and bed)
- 4) Sleeping habits and changes in diurnal cycles
- 5) Breakdown in adherence to general social norms  
(desocialization)
- 6) Disobedience
- 7) Talking
- 8) Social interaction
- 9) Boredom

The purpose and rationale for the behavior log and the automated video samples are detailed in another NMRI report (Donenfeld, Smith, Haythorn, Libert & Brown, 1970).

b. Automated Video Samples

Automated video samples of 20 seconds duration per room were taken sixteen times a day during free time activity periods. Details of the

video sampling system are presented in the laboratory section. The purpose of the automated video sampling was to establish a data bank from which to investigate such dimensions of non-verbal behavior as eye orientation, body orientation, and frequency of interaction. Such a data base also has the advantage of permitting later tests of promising hypotheses.

c. Manual Video Samples

Video samples were taken during questionnaire periods, selected tasks, re-supply periods, and whenever unusual or noteworthy behavior occurred.

At the beginning of each questionnaire session the automated video system was manually triggered to provide a 20-second sample from each room. The purpose of these data was to assess Ss' motivation toward questionnaire taking and their compliance with simple instructions.

Manually initiated video samples were also recorded periodically during the vigilance, discussion, and cryptography tasks. Three 20-second video samples were recorded for each room during the ten-minute period while Ss were preparing for re-supply. A second video sample of one-minute duration for each room was recorded following the first portion of the re-supply process. The purpose of the above data was to obtain measures of leadership and cooperative behavior.

d. Free Interaction Samples

Samples of whatever verbal behavior happened to be occurring (free interaction) were audio recorded from each room every other day (10 times/run) during three 1.5-minute periods. The observers used a microphone and provided a descriptive commentary that was recorded on the second

tape channel. This commentary identified the various speakers and gave an account of the activities of the room occupants.

The purpose of the free interaction samples was to gain information about the Ss' interactions over time and to provide verbal material for various analyses. One such technique being utilized is the Bales (1951) interaction process analysis. It deals with six functional aspects of interaction systems: orientation, evaluation, control, decision, tension-management, and integration. By utilizing Bales' twelve category scoring system, information will be obtained on both social-emotional and task oriented facets of behavior.

e. Unusual Events Log

The purpose of the unusual events log was to record any unusual or noteworthy behavior that was not dealt with in any of the other data collection techniques. Among the types of events recorded were complaints, arguments, potential or actual abort situations, and attempts to establish outside communication.

f. Re-Supply Log

The observers noted which subjects left the room during both portions of re-supply and the duration of time that the door remained open during the first portion of re-supply. The purpose of these data was to shed light on such things as work sharing and Ss' potential desire to leave the room briefly.

g. Observer Rating Forms

Individual rating forms for each subject were filled out by each

observer at the end of the 21-day confinement period and group rating forms for each room which were filled out at the end of the first, second and final week of the 21-day confinement period.

These ratings were designed to provide an alternative and independent evaluation of behavioral changes from an "overall clinical viewpoint" without reference to Ss' subjective questionnaire responses.

#### C. POST-CONFINEMENT

"Post-confinement" activities were ostensibly the same as the "Pre-confinement" days (see Appendix I). Ss underwent physical and psychiatric examinations to ascertain any ill effects of confinement. Several blood and urine samples were collected from all Ss and post-EEG tracings were taken on Ss involved in the EEG sub-study.

Ss were interviewed individually to obtain supplemental information which might not be available from questionnaire material or other sources. They also completed a "Post" Questionnaire Battery (see Table 2) to evaluate any psychological changes over the confined period.

At the end of these "Post" week activities a final group debriefing was given informing the Ss of the overall objectives of the project and to thank them for their participation. The subjects departure on Thursday or Friday, left the staff with three or four days to prepare for the arrival of the subjects for the next "Run."

#### QUESTIONNAIRE BATTERY

This section presents a description of the Project RIM Questionnaire Battery. Table 2 presents a summary schedule of the wide diversity of

\*Additional details about questionnaires and tasks are available on request to Dr. W. W. Haythorn, Department of Psychology, Florida State University, Tallahassee, Florida 32301.

# PROJECT RIM QUESTIONNAIRE SCHEDULE

## QUESTIONNAIRE

### PERSONALITY INDICES

BIOGRAPHICAL INVENTORY  
FUNDAMENTAL INTERPERSONAL RELATIONS ORIENTATIONS - BEHAVIOR  
EDWARDS PERSONAL PREFERENCE SCHEDULE  
ORIENTATION INVENTORY  
INTERPERSON TRUST SCALE  
FITZGERALD EXPERIENCE INQUIRY  
MINNESOTA MULTIPHASIC PERSONALITY INVENTORY  
INTERPERSONAL TOPICAL INVENTORY  
EYSENCK PERSONALITY INVENTORY  
BARRATT IMPULSIVITY SCALE

### DESCRIPTIONS OF SENSATION SEEKING OR ACTIVITY PREFERENCE

SENSATION SEEKING SCALE  
SENSATION SEEKING ACTIVITIES QUESTIONNAIRE  
MULTIPLE ACTIVITY PROFILE

### MEASURES OF MOOD, STRESS & EMOTIONAL SYMPTOMATOLOGY

PRIMARY AFFECT SCALE  
NORMALLY  
STATE  
SUBJECTIVE STRESS SCALE  
NORMALLY  
STATE  
SPIELBERGER ANXIETY  
TRAIT  
STATE  
MOOD ADJECTIVE CHECKLIST  
NORMALLY  
STATE  
ISOLATION SYMPTOMATOLOGY QUESTIONNAIRE

### MEASURES OF INTERPERSONAL FUNCTIONING

SOCIAL PENETRATION SCALE  
BEHAVIORAL DIFFERENTIAL



# PROJECT RIM QUESTIONNAIRE SCHEDULE

## QUESTIONNAIRE

GROUP CONFINEMENT INVENTORY  
BERKUN HOSTILITY SCALE  
PRIMARY SOCIAIBILITY SCALE  
GROUP SEMANTIC DIFFERENTIAL  
GROUP TASK INVENTORY  
ACQUAINTANCE SURVEY  
POST CONFINEMENT ECOLOGY MEASURE

## REACTIONS TO ROOM ENVIRONMENT

ANNOYANCE CHECKLIST  
ROOM SEMANTIC DIFFERENTIAL  
POST ROOM-CROWDEDNESS MEASURE

## MEDICAL INDICES

DAILY MEDICAL CHECKLIST  
CORNELL MEDICAL INDEX  
SLEEP AND DREAM QUESTIONNAIRE  
SLEEP RECALL QUESTIONNAIRE  
EEG SUBJECTS  
NON-EEG SUBJECTS

## MISCELLANEOUS QUESTIONNAIRES AND MEASURES

HULIN SATISFACTION SCALE  
PERSONNEL AND TRAINING EVALUATION  
POST EXPERIMENTAL INVENTORY  
TIME SAMPLE

## TASKS

VIGILANCE AND DESCRIPTIVE SENTENCE  
CRYPTOGRAPHY  
DISCUSSION  
DOT ESTIMATION

## RESUPPLY



questionnaires and tests used. Each questionnaire was given to gain one or more of the following types of information:

1. Pre-isolation baseline measures
2. Description of subject population
3. During isolation changes
4. Post retrospective measures
5. Pre-post changes

The questionnaires and tests tend to fall into 7 general categories:

1. Personality Indices
2. Descriptions of Sensation Seeking or Activity Preferences
3. Measures of Mood, Stress and Emotional Symptomatology
4. Measures of Interpersonal Functioning
5. Reactions to Room Environment
6. Medical Indices
7. Miscellaneous Questionnaires

Brief descriptions of each of the questionnaires and tests used are given below.

1. PERSONALITY INDICES

a. Biographical Inventory. This questionnaire obtains 48 items of demographic information. Among the demographic variables collected were age, ordinal position in family, education, and hometown size.

b. Fundamental Interpersonal Relations Orientation-Behavior (FIRO-B).

This questionnaire was derived by Schutz (1958) from his theory of interpersonal behavior, in which he describes three fundamental dimensions of interpersonal behavior, inclusion, control and affection. The FIRO-B measures "the individual's behavior toward others (e) and the behavior he wants from others (w) in the three areas of interpersonal interaction" (Schutz, 1958, p. 58).

c. Edwards' Personal Preference Schedule. This published test (Edwards, 1959) measures strengths of the manifest needs associated with 15 personality variables.

d. Fitzgerald Experience Inquiry. Fitzgerald (1966) designed this test to "assess Schachtel's (1959) concept of openness to experience, a modification of 'regression in the service of the ego'". Fitzgerald (1966 p. 661) describes an individual open to experience as being "....spontaneously original with the ability to shift from more to less regulated thinking with facility and yet maintain control."

e. Minnesota Multiphasic Personality Inventory. The published MMPI inventory (Hathaway and McKinley, 1951) assesses some of the major personality characteristics that affect personal and social adjustment.

f. Orientation Inventory. This inventory was developed by Bass, Duntzman, Frye, Vidulich, & Wambach (1963) to yield indices of Self, Task and Interaction Orientation. The authors describe task-oriented group members as "most attracted to a group by expectations of task success and its rewards," interaction-oriented members as "reaping rewards from the satisfactions of the interactions with others," and self-oriented members as "attracted to groups in the expectation of direct reward to themselves regardless of the task or interaction effectiveness of the group" (pp. 101-102),

g. Interpersonal Trust Scale. This scale measures interpersonal trust which Rotter (1967, p. 651) defines as "an expectancy held by an individual or a group that the word, promise, or verbal or written statements of another individual or group can be relied upon."

- h. Eysenck Personality Inventory. This published inventory (Eysenck and Eysenck, 1968) measures extraversion-introversion and neuroticism-stability.
- i. Barratt Impulsivity Scale. This is an operational measure of impulsivity developed by Barratt (1959, 1965). Impulsivity is conceived of as a personality predisposition with the following characteristics: "Impulsiveness: like to take a chance; seek adventure; act without thinking; avoid work requiring patience and carefulness; have variable behavior patterns (e.g., change plans often, don't stay with a task)" (Barratt, 1965, p. 550.),
- j. Intrapersonal Topical Inventory. This is an objective test of integrative complexity of the individual (Tuckman, 1965), following the model of personality structure espoused by Harvey, Hunt & Schroder (1961). Ss are classified into one of four systems of integrative complexity. These systems are postulated to fall linearly on an integrative complexity continuum.

## 2. DESCRIPTIONS OF SENSATION SEEKING OR ACTIVITY PREFERENCES

- a. Sensation Seeking Scale. This scale was designed to measure individual differences in desired "optimal level of stimulation, excitation or activation" (Zuckerman, Kolin, Price & Zoob, 1964). The authors conceive of the sensation seeking tendency as a "measure of sensitivity to internal sensations" (p. 480).

b. Sensation Seeking Activities Questionnaire. This questionnaire, developed by Myers (cited by Smith, et al., 1967), assesses eight patterns of activity preferences: Outdoor, Thrilling, Competitive, Vigorous, Sports Fan, Gambling, Solitary Pursuits, and Passive Pursuits.

c. Multiple Activity Profile. This questionnaire (Myers, 1969) yields five measures of life style concerned with various activity needs. The scales are: Chronic Worry, Activity, Thrill Seeking, Sociability, and Aversion to Confinement Conditions.

### 3. MEASURES OF MOOD, STRESS AND EMOTIONAL SYMPTOMATOLOGY

a. Primary Affect Scale. The PAS was developed by Johnson and Myers (1967) to measure state and trait affect or feeling in five areas: Happiness, Anger, Fear, Depression, and Arousal.

b. Subjective Stress Scale. The SSS was developed by Kerle and Bialek (1958) to measure state and trait subjective stress. The scale consists of 15 words or phrases which range from "wonderful" to "scared stiff." The S selects the word or phrase which best describes how he feels during a specific period of time.

c. Spielberger Trait-State Anxiety Inventory. This test consists of two scales designed to measure trait and state anxiety. Spielberger (1966, p. 17) conceives of trait anxiety as "individual differences in anxiety processes" and state anxiety as "subjective feelings of apprehension, 'anxious' expectation."

d. Isolation Symptomatology Questionnaire. The ISQ (Myers, Murphy, Smith and Goffard, 1966; Myers, 1969) was designed to assess retrospective

experiences of isolated subjects. It includes 31 content areas or factors, which are also grouped on the basis of factor analytic results into four clusters: Tedium, Unreality, Positive Contemplation and Anxiety.

e. Mood Adjective Checklist. This adjective checklist consists of items from an early isolation study (Myers, Murphy, Smith, & Goffard, 1966), a later adaptation (Johnson & Myers, 1967), and items added for the current project. A scoring procedure was developed by Project RIM staff members to yield normal and state measures of general positive and negative moods.

#### 4. MEASURES OF INTERPERSONAL FUNCTIONING

a. Group Confinement Inventory. A retrospective measure was developed for Project RIM to assess the effects of varying conditions of isolated confinement on individual and interpersonal functioning. It includes items from such a priori factors as Compatibility, Co-operation and Considerateness, Interpersonal Conflict, Individual vs. Group Activity, Boredom, Crowdedness, Morale, Anger, and Group Tensions. This instrument was piloted on the McDonnell-Douglas Sixty Day Confinement Mission and the Grumman Gulf Stream Drift Mission.

b. Social Penetration Scale. Taylor and Altman (1965) developed this scale to assess the temporal development of self-disclosure in interpersonal relations. Pre-isolation measures were made of each subject's level of self disclosure to the targets "close friend" and "casual acquaintance." Measures of self disclosure to the target "partner" were taken during isolation. The subjects in the three-man condition responded twice every time it was administered - once for each partner.

- c. Berkun Hostility Scale. Berkun, Burdick, and Woodring, (Undated) developed the H-scale to measure the extent of hostility a person has toward some specific object, person, or group. It consists of 15 phrases which range from "delighted with" to "raging mad at." The " selects the one phrase which best describes his feelings.
- d. Primary Sociability Scale. This Project RIM instrument is designed to measure degree or amount of sociability. It consists of two sets of five words. For each set, the S picks the word which "best describes the group atmosphere" over some specified time period and the word which "next best describes the group atmosphere" over some specified time period.
- e. Post-Confinement Ecology Measure. Developed for Project RIM this instrument was designed to examine the ways in which the physical environment and interpersonal relations in confinement influence the choice of living and working arrangements. The subjects were shown four floor plans (live together-work together, live separately-work together, live together-work separately, live separately-work separately) and were asked to "rank the plans in the order that you feel would best suit your group."
- f. Acquaintance Survey. This sociometric questionnaire was developed by Project RIM staff members to measure interpersonal preferences. Each subject was asked to list in order the 3 men he would most prefer as close friends, teammates on the mission and leaders on the mission. Information was also obtained from each subject on his length and degree of acquaintance with each of the other subjects prior to entering the confinement portion of the study.

g. Behavioral Differential. This scale was developed by Triandis (1964) to analyze the behavioral component of attitudes. It is administered and scored in a manner similar to the Semantic Differential (Osgood, Suci, & Tannenbaum, 1957). A modified Behavioral Differential was used which yielded two factors: Formal Social Acceptance with Subordination and Friendship Acceptance. The subjects in the three man condition responded twice every time it was administered - once for each partner.

h. Group Semantic Differential. Burke & Bennis (1961) developed this test to measure changes in perception of self and others. It is administered and scored in a manner similar to the Semantic Differential (Osgood, Suci, & Tannenbaum, 1957). The instrument was modified to include the following concepts:

1. The way I actually feel in this group
2. The way I would like to be in this group
3. How I think others in the group see me
4. How I see each man in this group
5. How I think each man in this group sees himself
6. How I think each man in this group sees me

Each of these concepts was rated against 19 bipolar scales (e.g., Good-Bad, Strong-Weak, Talkative-Silent) which break down into three main clusters:

A) Friendliness-Evaluation, B) Dominance-Potency, C) Participation-Activity.

i. Group Task Inventory (GTI). The GTI was developed by Project RIM staff members to measure the subject's impression of his roommates' task performance. This is similar to Osgood's (1957) semantic differential. It

consists of 9 bipolar scales: active-passive, unhelpful-helpful, co-operative-uncooperative, ineffective-effective, interested-disinterested, slow-fast, efficient-inefficient, quiet-lively and enthusiastic-unenthusiastic. This test was administered after each of the tasks where group functioning was required. After each of these tasks (Cryptography, Dot Estimation, and Discussion) each man rated his roommates individually on all scales.

5. REACTIONS TO ROOM ENVIRONMENT

a. Annoyance Check List. This checklist, developed by Project RIM staff members, is an adjunct to the Group Confinement Inventory. It was designed to obtain information about the sorts of things in the room environment that are sources of annoyance. The subjects indicated how much each item on a list of potential sources of discomforts annoyed them.

b. Post Room-Crowdedness Measure. This Project RIM instrument was designed to measure subjective perceptions of room crowdedness. Each S rated the room he lived in as well as the other rooms on a 7 point descriptive scale ranging from "very crowded" to "very uncrowded."

c. Room Semantic Differential. This instrument was designed by Project RIM staff members to measure a subject's subjective reactions to the physical environment he lived in during isolation. The scale was administered and scored in a manner similar to the Semantic Differential (Osgood, Suci, & Tannenbaum, 1957).

6. MEDICAL INDICES

a. Cornell Medical Index. The Cornell Medical Index was developed by Brodman, Erdmann, Large, & Wolff, (1949) as a quick and reliable method

of measuring the presence of somatic and emotional symptoms. It consists of 195 yes-no questions which correspond closely to questions usually asked in a medical interview.

b. Daily Medical Checklist. A medical checklist was developed for Project RIM to obtain information reflecting the different amounts of psychosomatic symptomatology present each day.

c. Sleep and Dream Questionnaire. The Sleep and Dream Questionnaire was developed for Project RIM to obtain information on baseline characteristics of sleep behavior.

d. Sleep Recall Questionnaire. The Sleep Recall Questionnaire was developed for Project RIM to obtain information on sleep disturbances during confinement. These data will be used to augment the EEG measures obtained.

e. Diaries. Each subject was issued a personal log book and was requested to make daily entries. This yielded an additional source of medical, psychiatric, and psychological information.

#### 7. MISCELLANEOUS QUESTIONNAIRES

a. Hulin Satisfaction Scale. This adjective check list, developed by Hulin (1962) was used to measure expressed satisfaction of individual group members with the overall mission or task.

b. Post Experimental Inventory. This instrument consists of a series of questions about experiences as a participant in Project RIM. The S was asked questions concerning why he volunteered, whether he thought the project was worthwhile, reactions to questionnaires and tasks, and conditions under which he would volunteer for similar projects.

c. Time Sample. This instrument was developed by Project RIM staff members to measure how an individual utilized his time during isolation. The subject was given a list of activities and indicated how much time he engaged in each activity during a specific time period.

d. Personnel and Training Evaluation. This instrument was developed for Project RIM to assess a subject's attitudes toward staff members and pre-isolation training procedures. The subject indicated his agreement or disagreement with each item on a scale ranging from "strongly agree" to "strongly disagree," excluding the neutral point.

\*TASK SECTION

Four days each week during confinement, tasks were presented to the subjects immediately after the questionnaire battery (see Table 2 for task schedule). Instructions for the majority, of the tasks were relayed over the television monitor. In addition each room was provided with a "Task Notebook" which contained some task materials and supplementary instructions. Tasks included:

1. Cryptography
2. Discussion
3. Dot Estimation
4. Descriptive Sentence
5. Vigilance

The following section gives a brief description of each of these tasks and describes the objectives and rationale for using them.

Cryptography

A cryptographic deciphering task was given as a group measure of reasoning ability. The task was structured to provide information about

\*Additional details about questionnaires and tasks are available on request to Dr. W. W. Haythorn, Department of Psychology, Florida State University, Tallahassee, Florida 32301.

the differences in the amount of cooperation as a function of experimental treatments. Three crypts, in increasing order of difficulty (see Appendix J) were presented at each task session. Subjects had 15 minutes to complete the first crypt of the session. The second and third crypts had a 30 minute time limit. Time cues were presented over the TV monitor. There was one cryptographic session each week of confinement (see Table 2). Sessions were balanced for difficulty.

Forced sharing of materials was effected by providing each room with only one set of written instructions, and one copy of each crypt. These materials were contained in the room's Task notebook.

Manual video samples were taken every 5 minutes throughout the task session and audio recordings were made for the entire duration of the session. These recordings were made to obtain information on the amount and kinds of interactions occurring during the task sessions.

#### Discussion Task

The discussion task, containing intellectual, emotional and attitudinal components, was used to measure group effectiveness and interaction. It was presented once each week during confinement. Each presentation consisted of a topic selected to be controversial so as to maximize potential divergent opinions. An example is given in Appendix K. Initially each man read the written problem, composed his private solution, and recorded it on paper. The group then discussed the problem and after a 20-minute period, selected a member to summarize aloud the group's consensus.

The following data were obtained:

1. Written private solutions
2. Transcribed group discussion
3. Transcribed group solution
4. Man announcing group solution

Dot Estimation Task

The Dot Estimation Task (Shaw, 1963) has been used as a group perceptual task (Thomas & Fink, 1963; Exline & Ziller, 1959), and to study communication networks and influence (Goldberg, 1955; Ziller & Exline, 1958). The primary objective in using this task was to investigate the influence of group members on one another.

The task consisted of the presentation of 6 stimulus patterns per session (one session per week of confinement). The stimuli were various arrays of typewriter asterisks ranging in number from 220 to 890 (see Appendix ' ). Each stimulus pattern was exposed 3 times for a 5-second period.

Thirty seconds after the first and third stimulus presentations subjects made individual estimates of the number of asterisks contained in the stimulus pattern. Ss made their responses on individual three-button response panels. During these presentations no interaction was permitted. After the second presentation subjects were given 2 minutes to interact and arrive at a group decision. At the end of the discussion period the group selected one man to indicate the group estimate on his individual response panel; accuracy and influence scores were generated from these responses.

### Descriptive Sentence Task

This individual intellectual efficiency task is patterned after Baddeley's (1968) 3 minute reasoning test based on grammatical transformation. The test was designed to measure intellectual efficiency under stress and was given to determine whether any changes in intellectual functioning occurred during the 21 days of confinement.

The test consists of 64 items and takes the following form:

1. A follows B - BA

The subject's task is to read each phrase (e.g., A follows B) and decide whether it is a true or false description of the letter pair (e.g., BA) which follows it.

The task was presented on days 1, 8, 15, and 21 via the television monitors. Subjects used IBM answer sheets to record their responses. The items moved from the bottom to the top of the television screen at the rate of one every 3.1 seconds. Each item was in view for 25 seconds, with the total task lasting 3 minutes and 42 seconds. This is a modification of Baddeley's paper and pencil format where the subjects are allowed 3 minutes to complete as many items as possible.

### Vigilance

The vigilance task was an individual performance measure designed to provide information about the effects of confinement on performance. The pre-recorded task involved watching the television monitor for infrequent signals in the form of letters. These letters moved from bottom to

top of the homogeneous background but were visible for only one second as they passed through a 1/2 inch high viewing area spanning the full width of the screen. The task was highly unpredictable with 24 different letters appearing at various locations across the viewing slit and at different time intervals (ranging from 3 to 70 seconds apart). Each subject in the room was assigned a specific and different signal letter. The only letters used as signals were: A, K and X. What was a "signal" for one subject was "noise" for his partner(s). Overall, five out of six letters presented were "noise." During the one-hour task each subject was presented 40 signals averaging 1 1/2 minutes apart with inter-signal intervals of 30 to 150 seconds.

A subject indicated the detection of a signal by pressing a button on his individual response panel (see Appendix M for task instructions). Dependent variables recorded were: a) correct responses, b) response latency, and c) false positives. Manual video samples taken at ten-minute intervals during the long boring task will be analyzed to evaluate alertness, cooperation and general task compliance.

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APPENDIX A

NAVAL MEDICAL RESEARCH INSTITUTE  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA, MARYLAND - 20014

VOLUNTEERS FOR PROJECT RIM

Male volunteers (E-3 through E-6) are being sought to serve in a special project at the Naval Medical Research Institute, Bethesda, Maryland, which is in suburban Washington, D. C. The project (Project RIM) is a large scale assessment of small crews of men living under crowded circumstances such as might be found in undersea and space vehicles and habitats to be in use during the 1970's and 1980's. Research interest is focused on many cross-disciplinary aspects of human functioning such as biochemistry, physiology and psychology.

Participation would occur upon completion of your time in school and would involve a 30 to 35 day temporary duty assignment enroute to your next duty station. Twenty-one days of that time would be spent living with one or two other men in a small simulated station where communications would be at a minimum and you would have relatively little to do. You would have comfortable furnishings and plenty of good food available. Nothing of a physically harmful or painful nature will occur during the study.

The purpose of this research project is to provide unique and valuable data to the U. S. Navy about design and staffing characteristics of future environments to be employed, particularly in the deep ocean. The research also has direct relevance and applicability to man-in-space and, hence, NASA is sponsoring a portion of the project.

If you are interested in participating in this important research effort, you should contact the office listed below:

Personnel Office  
Naval Submarine School  
New London, Connecticut

At this office you can obtain volunteering forms or additional details about Project RIM to help you decide whether or not you wish to volunteer to be a participant.

APPENDIX B

NAVAL MEDICAL RESEARCH INSTITUTE

NAVAL MEDICAL RESEARCH INSTITUTE

NATIONAL NAVAL MEDICAL CENTER

BETHESDA, MARYLAND 20014

ADDITIONAL DETAILS ABOUT PROJECT RIM PARTICIPATION

We would appreciate your careful consideration of several details before deciding whether you wish to volunteer for Project RIM. There is considerable expense and effort involved in your being a part of the research project, and unless you are really interested and are willing to accept fully all of the conditions and restrictions that participation will involve, we would strongly urge you not to volunteer.

Project RIM is a large research effort directed toward learning about how small groups of men function when required to spend long periods of time in crowded environments. If you become a participant you would come to the Naval Medical Research Institute, Bethesda, Maryland (located in suburban Washington, D.C.) where you would spend up to 35 days. Twenty-one days of that time would be spent living with one or two other men in a small one-room simulated duty station. There would be very little scheduled activity going on and you would be cut off from outside communications during the entire time. Very little reading and recreational material will be provided. Limited personal items such as toilet articles and some clothing would also be allowed in the rooms. For several days both prior to and after the 21-day stay you would be taking a variety of tests and undergoing medical evaluations. In other words, virtually your

entire time in Bethesda would be taken up by duties. During much of this time it will be necessary to restrict you to the base. There will be very little time free for liberty, even during the evenings and on weekends. Because of the lack of liberty and of low cost housing you should not consider bringing your family to Bethesda during your stay here.

The room you would occupy during the 21-day period will be comfortable but crowded. It contains a three-decker bunk, chairs, a table, a chemical toilet, a refrigerator, a microwave oven for cooking, and general storage facilities. The room is equipped with microphones and speakers and also a closed-circuit TV camera and monitor. These serve communication purposes and provide means for conducting testing. The room is kept at a constant 72-degree temperature by continuously recirculating fresh air. The lights will always be on but will be dimmed at night. You will be permitted to smoke and you will have clocks and a calendar to help you keep track of time.

There will be plenty of good food which you are free to eat whenever you wish. Minimum preparation and cleanup will be required by the diet. You will use bottled water for drinking and washing during your stay in the zoom.

During the 21-day period personnel from the project staff will be in the control center on a 24-hour-a-day basis. They are there for data collection purposes and to be responsible for general safety. Although they can observe you on TV and can hear you by means of the zoom microphones, they will not converse with you. There will be a limited schedule to follow with a few duties to perform. Occasionally questionnaires and tasks will be given. Many of these will ask you to give information about your experiences, while others will sample various types of performance.

Blood samples will be taken and urine will be collected for various medical evaluations. Other forms of medical monitoring such as EEG, body temperature, pulse, and the like, will also be employed.

If you choose to volunteer please understand that you are volunteering to remain a part of the project for the full duration of 30 to 35 days. You will not be free to withdraw unless illness or some such major circumstance requires it. Unless you are willing to participate on this basis we would rather that you not volunteer.

This project is sponsored and funded largely by the U. S. Navy and is being carried out using Navy laboratory facilities. However, NASA, by virtue of long-term space flight similarities, is also a sponsor. If you choose to volunteer, your assignment to the project would come directly from the Bureau of Personnel. The selection will be at random from among volunteers who meet the following criteria: 1) those graduating at a time when the project needs volunteers, and 2) those whose fleet assignments can be delayed for 35 days. Your participation should not alter your duty assignment in any way other than delaying its start. Generally, you may assume that being on the project will neither harm nor enhance your military career. For example, you are not likely to receive any special or unusual duty assignments in the future as a result of having participated. As incentives for participation in the full scope of the project you will be awarded \$.5 or \$100 (depending on your assigned role in the project), and a letter of commendation that will appear in your permanent file. Also you will have the knowledge that you are contributing to an important, interesting and

challenging project that will have considerable importance to the design and staffing of Navy and NASA environments of the 1970s and 1980s.

Although the project schedule may require altering the timing of your possible leave plans, participation should not prevent your taking leave prior to reporting to your next duty station.

During the 21-day stay in the room most of the clothing you will need will be provided. A couple of sets of uniforms and of dungarees and some civilian attire should be all you need for the rest of the time. There is limited space available for parking personal automobiles but the area is unpatrolled so there is some risk.

If you have any questions about participating in the project that aren't answered by the above please do not hesitate to contact us. You should direct your inquiry to:

Dr. Seward Smith  
Project RIM  
Naval Medical Research Institute  
National Naval Medical Center  
Bethesda, Maryland 20014

Note: In addition to the above materials, subjects also were shown an artist's conception of a typical room.

APPENDIX C

NAVAL MEDICAL RESEARCH INSTITUTE  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA, MARYLAND-20014

From: Deputy Director, Behavioral Sciences Department

To : Project RIM Volunteers

Subj: Orientation to Project RIM

1. Welcome to the Naval Medical Research Institute. NMRI is a research institute engaged in research in the physical, biological, and behavioral sciences. You have been ordered to temporary duty with NMRI's Behavioral Sciences Department because you volunteered to take part in Project RIM, an important Navy and NASA research project related to man's utilization in future weapons systems and in man-in-the-sea and man-in-space ventures.

2. You recall that participation involves living for twenty-one days with one or two other men in a small simulated station. This part of the project won't begin for several days. On Tuesday evening at 1830 hours Project RIM personnel will meet with you and will give you details of your stay here. In general however, here is some information that may be helpful.

3. You are being assigned quarters in Building 142 where you will bunk for the next few days. During that time you will make use of base mess and other facilities. You will have no duties until 1830 hours on Tuesday at which time information about your duty schedule will be given. It will be necessary to program your activities on a heavily demanding schedule from Tuesday evening on (including weekends) so you should make no plans with friends or relatives.

4. The project is divided into several phases, each phase bearing a strong relationship to every other phase. Every part of the project requires that you be oriented to what is happening as it happens. You will be briefed in detail about each part. We will not know for several days just how long each of you will spend with us. But it will in most cases be for a period of a good many days, so we would like you to get settled down and oriented for such a stay

5. On Tuesday morning you will begin following a plan of the day. It is important to the success of the project that you will follow your time schedule and the instructions given to you very carefully. From time to time you will see civilians visiting your barracks area. These people, wearing black name tags like yourselves, are people connected with the project whom you will meet later.

6. I know that you are interested in exactly what we are doing and must have plenty of questions. At the first briefing on Tuesday evening we will tell you more, so please be patient. I believe you will find your stay here interesting and pleasant. Thank you for the help you are giving us.

CARL M. WAGNER  
CDR, MSC, USN

APPENDIX D

RIM Briefing of Ss (Tuesday Evening) General Welcome

Good evening gentlemen. I am Dr. Smith, the responsible investigator on Project RIM. I would like to introduce members of our research staff.

We have come to welcome you to Bethesda and to give you a better overview of what to expect while you are here. As Dr. Wagner mentioned in the memo you received upon checking in, you will be briefed as you go along on the various parts of Project RIM. Tonight I will be covering a few general matters. Tomorrow I will be giving you considerable detailed information about your participation in the Project - during which time you will be shown our laboratory facilities.

We work for the Naval Medical Research Institute, the same command to which you have reported on TAD. Before telling you about the Project RIM staff I would like to tell you a bit about the Institute. The Naval Medical Research Institute (NMRI) was established over 25 years ago to conduct medical research on pressing problem areas for the U. S. Navy. It is a Bureau of Medicine installation. There are several different departments conducting both basic and applied research in many areas. There is extensive research being conducted on malaria and tropical diseases. Of course this stems from the world wide scope of the Navy's operations, with special priority given to diseases prevalent in Viet Nam. New surgical techniques are being developed here from research on animals. You have read of the marvelous achievements being made in organ transplants and in devices to assist or replace organs of the body. A good deal of the basic research on such areas as kidney transplants was carried out by investigators

at NMRI. Still other researchers are studying the effects of extreme temperatures and the manner in which your body adjusts to them. Several research activities here are related to man's entry into the sea. Perhaps you have read about the Navy's Sealab project in which men, on several occasions, have lived and worked on the ocean's floor. They are housed in a dwelling under hyperbaric conditions, entering the water to work and returning to their abode on the ocean's floor to eat and sleep. The Institute has many research efforts directed toward such environments as these to determine how man's physiology, disease resistance, and so on, are affected.

Most of the personnel on Project RIM are members of the Behavioral Sciences Department of the Institute. Many of us are psychologists. Other scientific disciplines also included on the Project staff are endocrinology, electrophysiology, biochemistry, and psychiatry. Broadly speaking, our joint job and the area of major interest for Project RIM is to conduct research that will help men to get along better and to improve their ability to perform their jobs in undersea weapons systems of the future and man-in-space environments. On the Navy's drawing boards, for example, are future vehicles that will carry small teams of men to the depths and in which they must work together for long periods of time with little or no contact or support from the outside world. We are trying to discover ways to improve this duty for such crews and to enable them to do their jobs more easily and more effectively.

We are interested in many areas of human functioning, both during baseline periods, as well as while people are living in rather crowded crew compartments. You are going to be entering a baseline measurement

period tomorrow morning. Beginning then and continuing for several days we will be conducting a wide variety of measures to evaluate your physical condition and baseline physiological status, and we will be asking you to fill out a large number of inventories to find out what sort of a person you are, your likes and dislikes, typical feelings, and so on. Beginning tomorrow, one by one, you will be given medical examinations followed later by routine psychiatric interviews. Later, you will begin taking various questionnaires and will be briefed in detail about the part of the project during which you will live in the laboratory.

I would like to comment on a few matters that may have occurred to you. First, nothing of a painful or harmful nature will occur while you are here in Bethesda. Secondly, in the course of your stay here you will be asked many questions, some of which are highly personal. I assure you that your answers will be used for research purposes only, will be kept in the strictest of confidence, and can never be linked to you personally by anyone not associated with this project. The results of the various measures will not be entered in your Navy records, and they will not affect your Naval career or assignments in any way. I am asking your fullest cooperation and your complete honesty in answering all questionnaires and in giving us any information. It is extremely important that you do your best at all times. Another point that I would like to stress deals with our answering the many questions you doubtless have. As we go along,

project personnel won't be able to answer immediately all of your questions about the project, for good and important research reasons. We will answer questions whenever we can, but some will have to be delayed until the end of your time here in Bethesda. We will have a thorough debriefing when the project is over and we will try to fill you in, in detail, as to the purposes for Project RIM and why you were asked to volunteer to come here. I might also mention that you will probably hear the usual string of rumors about our Project. I would encourage your paying no attention to such rumors. If you are really interested in the accuracy of any particular piece of information, please check it out with us.

Now a couple of administrative matters. For the next few days, until the laboratory part of the study begins, the senior man of your group will be responsible for seeing that all men understand and follow the schedule outlined in the plan of the day, and abide by the few rules that must be imposed in carrying out Project RIM. Some of your evenings this week will be free but you may be required to remain on the base and to be back in the barracks by a specific hour. The reason is that we will need you here at certain times in order to carry out the physiological baseline measures, and we want you well rested for the various testing periods.

We have prepared name tags for you. We want you to wear them (or your own if you have one) at all times when you are involved in Project RIM business. Incidentally, we are doing our best to be sure that you receive your pay without delay and to see that all other administrative matters are handled in a fashion that causes you the fewest problems possible. We would appreciate your bringing any difficulties or problems to our attention.

Part of what you do here is a non-military matter concerning you and the predominantly civilian researchers. That is, how seriously and sincerely you cooperate in taking the tests, carrying out the urine gathering procedure, and so on. Clearly we ask your best effort. Another part of what you will be doing here is strictly military and will be handled in the usual manner. The Naval Medical Research Institute has command responsibility for you and the Masters of Arms and other officers of the Institute are in charge of you during your stay here. How well you meet the daily schedule, your cooperation in housekeeping matters, your personal conduct around the base, and so on, are of course military responsibilities.

We will be talking together again tomorrow, but perhaps you have some questions that I can answer now.

Possible areas I might raise:

- Quarters OK?
- Have everything you need?
- Trouble finding base facilities?
- Recreation room have necessary things in it?
- Warm or cool enough?

Finish by:

Giving senior man the schedule for the week and letting him know that the group is free until 2200. Have him review the week's schedule for the Ss and then post one copy on the bulletin board.

APPENDIX E

PROJECT RIM

PLAN OF THE DAY

MONDAY

TIME	EVENT	PLACE
1630	Men still arriving	Report to MA Desk, Bldg. 17
1700-1830	Chow	Mess Hall
1830-1930	Briefing (all men who have arrived)	Briefing Room, Bldg. 142
1930-2200	Free Time	
2200-0600	Be in Barracks - Lights out	

PROJECT RIM  
PLAN OF THE DAY  
TUESDAY

<u>TIME</u>	<u>EVENT</u>	<u>PLACE</u>
0600-0800	Chow	Mess Hall
0800-0900	Free Time	
0900-1200	Briefing	Briefing Room, Bldg. 142
0945-1145	In-Room Briefing	Lab Area, Room #6
1145-1230	Chow	Mess Hall
1230-1630	EEG	Bldg. 17A Lab Area
1300-1630	Physicals	Dr. Steinberg's Office, Bldg. 142
1700-1800	Chow Restricted to Base Restricted from Club	Mess Hall
1800-1900	EEG Training	Lab Area Bldg. 17-A
1900-2100	Briefing and Question- naires	Briefing Room Bldg. 142
2100-2200	Free Time	
2200	IN RACK/LIGHTS OUT	

NO FOOD AFTER 2000 HOURS

## PROJECT RIM

## PLAN OF THE DAY

WEDNESDAY

TIME	EVENT	PLACE
0645-0700	Blood Sample	Rack Area
0700-0800	Chow	Mess Hall
0830-1200	Questionnaire (ALL MEN)	Briefing Room Bldg. 142
1200-1300	Chow	Mess Hall
1300-1630	EEG (All men not yet processed)	Lab Area Bldg. 17-A
1315-1630	Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1700-1800	Chow	Mess Hall
1800-2000	EEG Training (ALL SENIOR MEN)	Lab Area Bldg. 17-A
1800-2100	Restricted to Base (all other men free to use base facilities)	
2100-	EEG Night Session (Men to be notified)	Lab Area Bldg. 17-A
2200-	IN RACK/LIGHTS OUT	

## PROJECT RIM

## PLAN OF THE DAY

THURSDAY

TIME	EVENT	PLACE
0630-0800	Chow	Mess Hall
0800-0900	In-Room Training	Lab Area, Bldg. 17-A
0900-1200	Questionnaires	Briefing Room, Bldg. 142
0900-1200	Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1200-1300	Chow	Mess Hall
1300-1600	Questionnaires	Briefing Room, Bldg. 142
1300-1400	In-Room Training	Lab Area, Bldg. 17-A
1300-1400	Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1400-1630	Physical-Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1700-1800	Chow	Mess Hall
1830-2000	EEG Training (All Senior Men)	Lab Area, Bldg. 17A
1800-2200	Restricted to Base Restricted from Club	
2200	IN RACK/LIGHTS OUT	

NO FOOD AFTER 2000 HOURS

## PROJECT RIM

## PLAN OF THE DAY

FRIDAY

<u>TIME</u>	<u>EVENT</u>	<u>PLACE</u>
0645-0700	Blood Sample	Rack Area
0700-0800	Chow	Mess Hall
0900-1200	Questionnaires	Briefing Area Bldg. 142
0900-1200	Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1200-1300	Chow	Mess Hall
1300-1345	Photos (all men)	3rd Deck, Bldg. 17, Room 308
1345-1430	Visual Perception Test	Rack Area
1430-1700	Questionnaires	Briefing Area, Bldg. 142
1430-1630	Psychiatric Exam	Dr. Steinberg's Office, Bldg. 142
1430-1630	Visual Perception Test	Rack Area
1700-1800	Chow	Mess Hall
1830-2000	EEG Training (All Senior Men)	Lab Area Bldg. 17A
1800-2000	Restricted to Base (free to use base facilities)	
2000-	All men restricted to rack area except those in EEG night session	
2200-	IN RACK/LIGHTS OUT	

PROJECT RIM

PLAN OF THE DAY

SATURDAY

TIME	EVENT	PLACE
0730	Chew	Rack Area
0900-1200	Questionnaires (all men)	Briefing Area
1215-1300	Chow	Rack Area
1300-1730	Free Time/Restricted to Rack Area	
1730-1830	Chow	Rack Area
1900-	Liberty	Unrestricted

RETURN BY 2000 SUNDAY

DRINKING RESTRICTED AFTER 1800  
SUNDAY NIGHT

NO FOOD AFTER 2000 HOURS

APPENDIX F

Room 6 RIM Briefing - Project Details

Today we want to give you a much more detailed briefing about Project RIM, particularly the part of the Project during which you will be living for 21 days in this or another of our six rooms. I have divided the total group in half for this briefing because of the limited space in this room. In case you are wondering, the other group will (has) receive (received) the same information as this group will.

As you are probably aware by now, you have come from several Naval bases around the country. Presumably, you all chose to volunteer for Project RIM after seeing the same materials describing the project. I would like to read a briefed down version of the material that should have been available to you in making your decision to volunteer. Among other things I want to be absolutely certain that you volunteered of your own free will.

With certain license taken with verb tense, etc., the materials read in part: Project RIM is a large research effort directed toward learning about how small groups of men function when required to spend long periods of time in crowded environments. You have come to the Naval Medical Research Institute in Bethesda, Maryland where you will spend up to 35 days. Twenty-one days of that time will be spent living with one or two other men in a small one-room simulated duty station. There will be very little scheduled activity going on and you will be cut off from outside communications during the entire time. Very little reading and

recreational material will be provided. Limited personal items such as toilet articles and some clothing will also be allowed in the rooms. For several days both prior to and after the 21-day stay you will be taking a variety of tests and undergoing medical evaluations. In other words, virtually your entire time in Bethesda will be taken up by duties. During much of this time you will have to be restricted to the base and there will be little time free for liberty.

The room you will occupy during the 21-day period will be comfortable but cramped. It contains a three-decker bunk, chairs, a table, a chemical toilet, a refrigerator, a microwave oven for cooking, and general storage facilities. The room is equipped with microphones and speakers and also a closed circuit TV camera and monitor. These serve communication purposes and provide means for conducting testing. The room is kept at a constant 72 degree temperature by continuously recirculating fresh air. The lights will always be on but will be dimmed at night. You will be permitted to smoke and you will have clocks and a calendar to help you keep track of time.

There will be plenty of good food which you will be free to eat whenever you wish. Minimum preparation and cleanup will be required by the diet. You will use bottled water for drinking and washing during your stay in the room.

During the 21-day period project personnel will serve as observers in the control center on a 24-hour-a-day basis. They will be there for data collection purposes and to be responsible for general safety.

Although they will, at all times, be able to observe you on TV and hear you by means of the room microphones, they will not ever converse with you. There will be a limited schedule to follow with a few duties to perform. Occasionally tests will be given. Many of these will ask you to give information about your experiences. Others will present tasks for you to perform. Pre and post blood samples will be taken and urine will be continuously collected for various medical evaluations. Other forms of medical monitoring such as EEGs, body temperature and pulse rate will also be employed.

This project is sponsored and funded largely by the U. S. Navy and is being carried out using Navy laboratory facilities. However, NASA, by virtue of space flight similarities, is also a sponsor. Your assignment to the project came directly from the Bureau of Personnel. You were selected at random from among volunteers meeting the following criteria: 1) you graduated at a time when the project needed volunteers, and 2) your fleet assignments could be delayed for 35 days. Your participation should not alter your duty assignment in any way other than delaying its start. Generally, you may assume that being on the project will neither harm nor enhance your military career. For example, you aren't likely to receive any special or unusual duty assignments in the future as a result of having participated. Your main incentive, other than your cash award and a letter of commendation, will have to be the knowledge that you are contributing to an important project that will have considerable importance to the design and staffing of Navy and NASA environments of the 1970s and 1980s.

Although the project schedule may have required altering the timing of your possible leave plans, participation should not prevent your taking leave prior to reporting to your next duty station.

I want to quote a final paragraph that was included. "If you choose to volunteer please understand that you are volunteering to remain a part of the project for the full duration of 30 to 35 days. You will not be free to withdraw unless illness or some such major circumstance requires it. Unless you are willing to participate on this basis we would rather that you not volunteer."

Later I am going to pass out forms that I would like you to sign that state that you have, in fact, volunteered for this project. I hope you weighed your decision carefully because we need your fullest cooperation and willing participation from now until the completion of your stay at NMRI.

Let me turn now to the 21-day stay in these rooms. Looking around this special room, you will probably note that it doesn't appear to simulate any particular duty station you may have occupied in the past. Actually we are interested in how crews of men perform when they have limited space and have little to do. A couple of examples might be useful. There will probably be Naval duty stations in the next few years that are located on the ocean's floor. There will be times when the crew members will have much to do, but there may also be many times when the mission requirements (for instance, surveillance) will be at a low ebb and where maintenance and repairs have all been performed. A similar example could easily occur during a lengthy, distant space voyage of the future. There could easily

be a time during such a mission when the crew had no responsibilities for piloting the vehicle, all repairs and maintenance were done, and on-board experiments were all shut down to conserve power or because the vehicle was at the wrong place in the cosmos. We are interested in how crews in such vehicles and habitats would handle such slack periods in their missions. These rooms are set up to permit us to simulate such a situation.

When the 21-day period begins you will enter one of these rooms.

Actually the arrangements of the other five rooms differ somewhat from this one, because we are trying out various room layouts. A 1st or a 2nd class petty officer will be assigned to each room as the group leader - and as I mentioned earlier a total of two or three men will occupy each room.

While you are in the room there will be periods on most days when you will be given tasks or questionnaires. You will also carry out medical monitoring and occasional other duties. Generally speaking, relatively little of your time will be scheduled <sup>in</sup> the outside. You will receive full training later for all tasks you will be expected to carry out while in the rooms. Those of you who will have leadership responsibility will receive instructions later detailing your duties.

The basic job assigned to all of you during the 21 days is to function as effectively as you can, carrying out all required tasks to the best of your ability and utilizing your spare time as you see fit.

Any time you are not in bed we will ask you to wear a special over-jersey used to help identify each of you. You will be wearing some of your own clothing such as socks, footwear, fatigue pants, and perhaps something to cover your arms for added warmth. We will tell you in detail

later what to bring into the rooms but I wanted to alert you to get your clothing washed prior to next Monday morning when the 21-day period will begin.

While you are in the rooms you will have access to some games, cards, writing materials, and exercise equipment. We will not send nor will you receive any mail during the 21-days. Of course, if an emergency arose we would notify you.

In order to guarantee that we would have the full number of men needed for this run of the project we had to have extra men assigned to NMRI. The extra number was to cover possible last minute withdrawals due to administrative or medical problems. We need a total of 14 men for the 21-day part of the study. All of you will participate in the first part but \_\_\_\_\_ of you will have to be sent on to your next duty station after Monday morning. I am sorry if this ends up being a disappointment to those who will not be able to be in the 21-day part of the study, but I felt I should tell you at this time.

#### ROOM CONSTRUCTION

Soundproof  
Double walls, floor, ceiling,  
Front door not locked

#### Bed

Foam rubber mattress  
About same space as in nuclear sub

#### Chairs

One per man in room

#### Desk-table

#### Storage

Microphones

Ceiling  
Wall

24 hrs. per day coverage - won't converse, professional - no goldfish bowl

Earphones

Loudspeakers

TV Camera - Wide angle

TV Monitor - tasks & questionnaires - TV editorial style

Microwave Oven - No burn potential

Ten times faster than conventional cooking

Refrigerator - Freezer

Food - Macke Co - see blue book

Water - bottled spring

Washing - Wash-n-dri, towels, soap & water

Water Disposal System

Chemical Toilet - Celeste packet & water

Urine Collection System - Coded jars - Coded funnels

Trash Collection

Ventilation - Separate intake & exhaust ducts

Complete turnover of air each 3-4 minutes  
Deceptive because of silencing of ducts.

Re-supply - 5 day food - frozen, refrigerated, & dry  
New chemical toilet liner & bucket

Details given later about when and how

Response Switches

IBM Forms

Appendix G (S)

COMPREHENSIVE BEHAVIOR LOG

HOUR SAMPLED	ROOM	SHIFT	DAY	DATE	OBSERVER
SAMPLE MAN A - NAME	ID#	MAN B - NAME	ID#	MAN C - NAME	ID#
Act	Loc	Tlk	Soc	Viol	Act
Tlk	Soc	Viol	Comments	Act	Loc
1					
2					
3					
4					
5					
6					

## Appendix G (b)

## UNUSUAL EVENTS LOG

**ROOM**      **DAY**      **SHIFT**      **OP SERVER**

**MAN A**   **ID#**

**MAN B**   **ID#**

MAN C ID#

## Appendix G (c)

## RESUPPLY LOG

RUN \_\_\_\_\_

DAY \_\_\_\_\_

DATE \_\_\_\_\_

OBSERVER \_\_\_\_\_

ROOM	SUBJECTS NAME - ID#	First Portion of Resupply		Second Portion of Resupply	
		Total time Door Open- In Seconds	Who Left Room -	Who Left Room -	Who Left Room -
1	MAN A -				
	MAN B -				
2	MAN A -				
	MAN B -				
3	MAN A -				
	MAN B -				
	MAN C -				
4	MAN A -				
	MAN B -				
5	MAN A -				
	MAN B -				
6	MAN A -				
	MAN B -				
	MAN C -				

**Appendix H**  
**Behavior Log Categories**  
**LOCATION**

**ACTIVITY**

AEX - Exercise	LTB - Top bunk
AJA - Playing game alone	LMB - Middle bunk
AGT - Playing game together	LBB - Bottom bunk
ARW - Reading, writing or drawing	LFC - Far chair
ADN - Doing nothing, awake, unaware	LMC - Middle chair
APA - inactive, perhaps asleep	LNC - Near chair
ADA - Inactive, definitely asleep	LFL - Lying or sleeping on floor
APF - Preparing food	LHD - Head
AEA - Eating alone	IDM - Desk, middle sitting at
AEI - Eating together	LDO - Desk, other than middle, sitting at
ATQ - Taking questionnaires, doing tasks, medical monitoring	LSD - Sitting on the desk
	LSI - Standing, near camera
	LSF - Standing, far from camera
	LRM - Random moving about, pacing
	LSB - Sitting on the bunk

**TALKING**

TRP - Talking about immediate situational room matters in a personal proung manner
TRN - Talking about amedire situations in room matters in a non person, "superficial" manner
TNP - Talking about non room matters in a personal proung manner
TNN - Talking about non room matters in a non personal superficial manner
TCO - Complaints of all sorts
TCS - Comments to staff
TAB - Talks of abort
TCC - Talking, can't classify
TSN - Self-made noises (whistling, singing, tapping, etc.)

**VIOLETION**

**DESOCIALIZATION**

SWH - Washing hands, face, teeth, body, hair, etc.
SPG - Personal grooming - nails, hair, shoes, shaving
SUR - Cleaning room (desk, floor, refrigerator, etc.)
SST - Setting table for meals or snacks
SCC - Changing clothes - putting on clean clothes
SMB - Making bunk

VNJ - Not wearing jersey
VOC - Attempting outside communication
VFE - Moving furniture or equipment
VTD - Tampering/damaging equipment
VSB - Smoking in bed
VOD - Opening door at improper time
VTQ - Improper questionnaire task procedure

APPENDIX I  
**PROJECT RIM**  
**PLAN OF THE DAY**  
**MONDAY**

TIME	EVENT	PLACE
0800	21-day mission ends	In Rooms
0805	Blood Sample	In Rooms
0815	Breakfast	In Rooms
0845	Questionnaires (all men)	In Rooms
1130-1200	Lunch	In Rooms
1200-1300	Release to Barracks	
1300	1. EEG Session	Lab Area Bldg. 17-A
	2. When men are free for at least a half-hour period, each man must check out with the personnel office before 1630	Personnel Office Bldg. 17-A
1700-1830	Chow	Mess Hall
1830-2200	Restricted to Base Restricted from Club Free to use other Base Facilities	
	<u>NO FOOD AFTER 2000 HOURS</u>	
2200	In Rack/lights Out	

## PROJECT RIM

## PLAN OF THE DAY

TUESDAY

TIME	EVENT	PLACE
0645	Blood Sample	Rack Area
0700-0800	Chow	Mess Hall
0900-1200	Dr. Steinberg's Interview	Dr. Steinberg's office, Bldg. 142
0830-1015	In Room Interview	Visitor's Desk, Bldg. 17-A
1000-1200	In Room Interview	Visitor's Desk, Bldg. 17-A
1200-1300	Chow	Mess Hall
1300-1445	In Room Interview	Visitor's Desk, Bldg. 17-A
1300-1600	Dr. Steinberg's Interview	Dr. Steinberg's Office, Bldg. 142
1700-1830	Chow	Mess Hall
1830-2200	Restricted to Base Restricted from Club Free to use other Base Facilities	
	<u>NO FOOD AFTER 2000 HOURS</u>	
2200	In Rack/Lights Out	

## PROJECT RIM

## PLAN OF THE DAY

WEDNESDAY

TIME	EVENT	PLACE
0645-0700	Blood Sample	Rack Area
0700-0800	Chow	Mess Hall
0900-1200	Dr. Steinberg's Interview	Dr. Steinberg's Office, Bldg. 142
0900-1200	Room Policing Detail	Lab Area, Bldg. 17-A
1200-1300	Chow	Mess Hall
1300-1600	Dr. Steinberg's Interview	Dr. Steinberg's Office, Bldg. 142
1300-1530	Barracks Policing Detail	Rack Area
1530-1600	Inspection	Rack Area
1700-1830	Chow	Mess Hall
1830-2200	Free Time Free to use Base Facilities  In Rack/Lights Out	

PROJECT RIM

PLAN OF THE DAY

THURSDAY

TIME	EVENT	PLACE
0700-0800	Chow	Mess Hall
0900-1200	Questionnaires (all men)	Briefing Room, Bldg. 142
1200-1300	Chow	Mess Hall
1300-1600	Photographic Project Documentation Period	To be arranged
1300-1400	Dr. Steinberg's Interview	Dr. Steinberg's Office, Bldg. 142

PROJECT RIM

PLAN OF THE DAY

FRIDAY

TIME	EVENT	PLACE
0700-0800	Chow	Mess Hall
0830-0930	Check Out	Personnel Office, Bldg. 17-A
0930-	Debriefing (all men)	Briefing Room, Bldg. 142

Appendix J

CRYPTS AND SOLUTIONS  
PROJECT RIM

SESSION # 1

CRYPT # 1

HWODSLIOSAKTALEMHSER  
OGOIILNIBSEBLTATIYAX

METHOD: RAIL FENCE CIPHER

H W O D S L I O S A K T A L E M H S E R  
O G O I I L N I B S E B L T A T I Y A X

SOLUTION: How good is Illinois' basketball team this year?

CRYPT # 2

USECS CSIPW C1MR  
PEENP ILSEG LNEUD

METHOD: HORIZONTAL OR VERTICAL ROUTE TRANSPOSITION,  
6 LETTER UNITS

U S I N G	U S E C S C
S I M P L	o r S I P I W C
E P R I N	I M R P E E
C I P L E	N P I L S E
S W E S U	G L N E U D
C C E E D	

SOLUTION: Using simple principles we succeed.

CRYPT # 3

15.29 - 29.15.7 - 25.9.27.27 -  
21.7.7.11 - 11.3.9.5 - 23.29.13.7 -  
29.15 - 21.17.15.19 - 29.23.23.  
17.5.9.29.15.5

METHOD: INTERNAL SOLUTION

SOLUTION: No one will meet this code on many occasions.

Appendix K

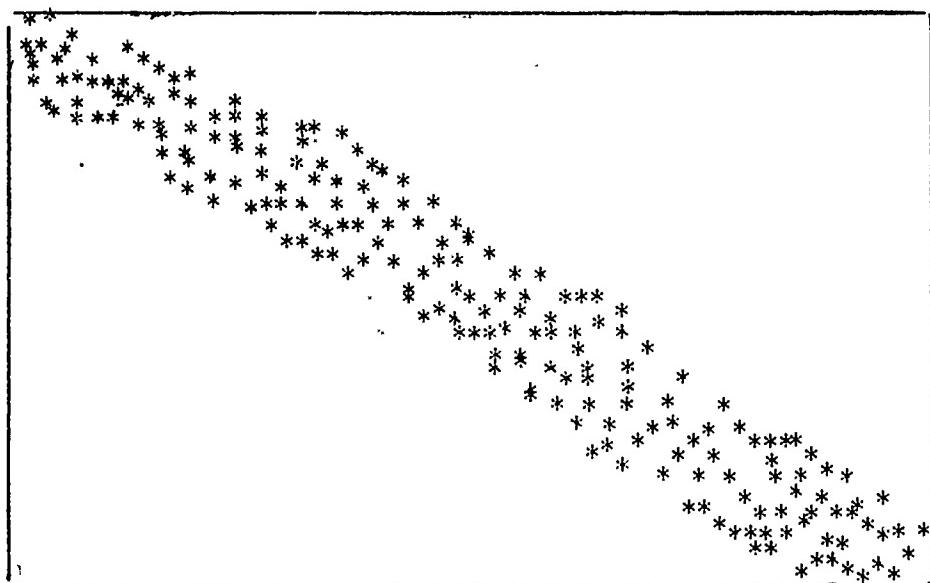
DISCUSSION STATEMENT

"The church as an institution is outdated and no longer serves a useful function in modern society."

Note: During both the private and discussion periods, try to answer the following questions:

1. What functions does the church serve in our society?
2. Are these functions necessary to modern man?
3. Can these functions be served equally well by other social institutions?

DOT ESTIMATION



Appendix M  
VIDEO VIGILANCE TASK

Instructions

In this task we would like to see how quickly you can detect and respond to a video signal. For the next hour you will see on the monitor a picture like this.....(A 20 second sample of the task was presented). Your job will be to detect specific signals. As you can see the signals are letters and that they come at varied intervals at a fairly rapid rate.

Man A will be looking for the letter "K". Man B will be looking for the letter "A", and in the three man groups Man C will be looking for the letter "X".

Each man will be responsible for his own assigned letter and he is to ignore all other letters. Please pick up your three button response box now.....be sure you have the correct one.

You will record the detection of your assigned letter by pressing, as rapidly as you can, the number one button on your response box. That is, each time you see your letter appear you should rapidly depress the number one button.

Remember: Man A your letter is "K"

Man B your letter is "A"

Man C your letter is "X"

Pause: Get ready.... The task will begin in a moment.

**UNCLASSIFIED**

Security Classification

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13. ABSTRACT In the fall of 1968, a comprehensive investigation into the psychological and physiological effects of long-term isolation and confinement began in the Behavioral Sciences Department of the Naval Medical Research Institute. This study represented the culmination of Project ARGUS, a seven-year program of research investigation performance effectiveness of small crews in future weapons systems. The purpose of RIM was to incorporate the findings of Project ARGUS, and more specifically to investigate long-term monotony and boredom, in order to establish a bank of information which is necessary for the design and implementation of lengthy missions such as those proposed by NASA and future Navy projects.		
The purpose of this paper is to provide comprehensive documentation of the research rationale and procedures for Project RIM. It is intended primarily as a reference document to answer broad as well as detailed questions that cannot be answered thoroughly in the limited space of a journal publication. No research data results are included in this paper. The various data areas of this small-group confinement study will be detailed in other papers as analyses are completed.		

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Isolation						
Confinement						
Small group						
Group compatibility						
Crowdedness						
Leadership						
Group size						
Group performance						
Stress						

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